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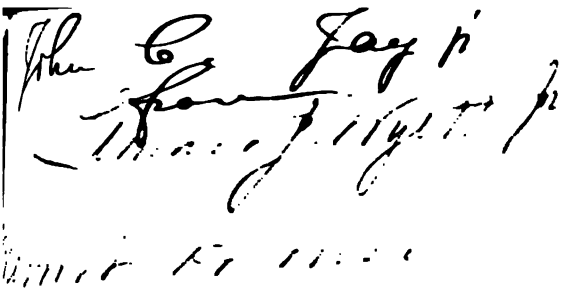

THE

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THE

SURGEON'S VADE MECUM:

A MANUAL

OF

MODERN SURGERY.

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BY

ROBERT DRUITT,

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SENIOR SURGEON TO THE HAMPSHIRE COUNTY HOSPITAL AT WINCHESTER,

IN ADMIRATION OF HIS SOUND JUDGMENT AND SKILL
IN SURGERY,

AND

IN GRATEFUL ACKNOWLEDGMENT OF EARLY KINDNESS,

THIS WORK

IS DEDICATED BY HIS AFFECTIONATE NEPHEW

AND OBEDIENT SERVANT,

ROBERT DRUITT.

PREFACE.

The rapid sale of this Work again gives me the gratifying task of expressing my thanks for the great favour with which it has been uniformly received by my professional brethren.

If I may venture to speak of the circumstances which have insured it so great a popularity, I may say that I believe them to be, the great amount of pathological doctrine which is interwoven with the practical details, the wide range of opinions represented, and the attempt to gain conciseness, not by omission, but by a clear arrangement, and by abridging all superfluities of diction. In the present edition, I have adhered to the same plan, while I have endeavoured to carry it out even more completely. The great doctrines of pathology, upon the extension of which all solid improvement in medicine depends, are, I hope, clearly and fully stated, so far as my subject required it. The importance of a healthy composition of the blood; the occurrence of local disease as a consequence of defective or poisoned conditions of that fluid; the true significance of traumatic fever; the conditions which give rise to inflammation; the vast importance of a tranquil condition of the nervous system; the true method of preventing and relieving inflammation; the characters of various effusions, and of the morbid changes consequent upon them; the microscopical characters of the various morbid growths, carefully delineated from actual specimens, under my own eye; the diagnosis of cancer from epithelioma, and various other growths which most resemble it in outward appearances and detrimental *consequences; the real nature* and affinities of

pyohæmia, and its distinction from phlebitis; the nature and diagnosis of organic and inorganic substances which may be present in the urine; the improved modern treatment of aneurism, and of the diseases of the ear and eye; the history of lithotrity, and the mode of performing the operation; a full investigation of the properties of chloroform, and of the prevention and treatment of accidents which may arise from it; a revision throughout of the constitutional treatment of local disease, and the improvement of the prescriptions which form an Appendix to the Work. These may be taken as specimens of the subjects that are more fully and clearly treated of; and it will be found that not only is there throughout a careful revision of the old matter, but that many entire sections are absolutely new.

It would scarcely be possible, in the limits of a preface, for me to make due acknowledgment to the numerous kind friends in various parts of the world—I may truly say from China to Peru—who in various ways have assisted me in my labours, by many a friendly suggestion and word of encouragement. But I cannot omit to mention Professors Partridge and Fergusson, Mr. Henry Lee, Dr. Beale, and the other medical Professors of King's College, a school to which my early associations and subsequent familiarity bind me with ties of especial regard. To Mr. Coulson and his colleagues at St. Mary's Hospital; to Mr. Haynes Walton, Mr. Harvey, Dr. Tanner, and Mr. Henry Smith, my pages will show that I am in many ways obliged for valuable information; although they cannot show adequately the personal kindness for which I am still their debtor.

ROBERT DRUITT.

39A, *Curzon Street, Mayfair, London,*
1st December, 1853.

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THE

SURGEON'S VADE MECUM.

PART I.

CONSTITUTIONAL EFFECTS OF LOCAL INJURY AND DISEASE.

CHAPTER I.

PROSTRATION, OR COLLAPSE.*

DEFINITION.—As the most proper commencement of a systematic treatise on Surgery, we shall begin by describing a state commonly known as *prostration*, or *collapse*, or *shock to the nervous system*; by which terms we signify that general depression of the powers and actions of life, which immediately follows any severe injury.

SYMPTOMS.—The usual symptoms are, that the patient lies cold, and half unconscious; with a feeble pulse and imperfect sighing respiration. If the symptoms are analyzed, they will be found to be compounded, 1st. Of the effects of depression of the heart's action; including the symptoms commonly known by the term *syncope*; and 2nd. Of the effects of shock, or interruption to the functions of the brain and nervous system; and it will be found that these sets of symptoms are unequally combined in various cases. Thus, sometimes depression of the vascular system predominates, and the patient lies in a state of perfect syncope, with the pulse and respiration imperceptible. Sometimes the nervous system is chiefly affected, the patient being insensible, even though the heart's action is restored; or bewildered and incoherent, as though intoxicated; or even comatose, as though he had taken a narcotic poison. Nausea and vomiting; hiccup; suppression of urine; and in children, convulsions, are also very frequent symptoms.

The *duration* of these symptoms is also extremely various. Sometimes they pass off very quickly; but they may remain even for forty-eight hours before reaction is thoroughly established.

* The principal authorities to be consulted on the subjects of the first and second chapters, are Travers on *Constitutional Irritation*, third edition, and Hunter on the *Blood*, chap. ii.

TERMINATIONS.—The process of recovery from collapse is commonly called *reaction;* and if this is healthy and moderate, and especially the collapse does not arise from injury of any vital organ, and is not attended with the other unfavourable circumstances to be mentioned presently, it will lead to complete recovery.

Secondly. If reaction be imperfectly developed, or if the injury to the nervous system is severe, that state of nervous irritation or *prostration with excitement* may follow, which is described in the next chapter.

Thirdly. If reaction be altogether wanting, the collapse will terminate in *death* by *syncope* or *asthenia.*

CAUSES.—These symptoms may be caused by every variety of injury to which mind or body is liable. Great and sudden extremes of grief, or joy, or fear, or cold;—large doses of any corrosive or sedative poison, such as arsenic, or tobacco;—great loss of blood, and mechanical injuries. It is most important that the surgeon should know what injuries are most likely to be followed by fatal collapse, in order that he may have proper materials for giving his prognosis. They are:—

First. Those of organs that are necessary to life, as the stomach and brain; and it is well known that a severe concussion of either of these organs may extinguish life instantaneously.

Secondly. Extensive injuries of organs which do not easily admit of reparation; as the joints.

Thirdly. Injuries that are severe in their nature; as lacerated, contused, and especially gunshot, wounds.

Fourthly. Injuries of great extent, especially of the skin, although they may be trivial in degree; as extensive burns; or injuries that cause very great *pain.* Severe pain, by itself, is capable of exhausting the vital powers.

Lastly. Injuries occurring to young infants, or to the very aged; or to constitutions that are enfeebled by excess and intemperance, or by long-standing bodily disease, or mental depression. From this it will be learned that the slightest injury or surgical operation may prove fatal to persons who labour under chronic organic disease, such as tubercles in the liver or lungs, or disease of the kidneys; or who have been harassed by continued anxiety and despondency of mind; so that in almost any case a firm persuasion that recovery is impossible is almost sufficient to render it so.

TREATMENT.—Supposing a patient to have just received a severe injury, and that independently of hæmorrhage, or of any local injury, he is in such a state of faintness and depression as to render his life precarious, the indication is, to excite the heart and brain to a moderate and healthy reaction. The remedies are, stimulants, of which hot brandy and water (or Formula 27) is the best;—nourishment, such as beef-tea;—and warmth by means of blankets, or of heated bricks, or bottles of hot water put under the axillæ and between the thighs. When warmth and circulation are restored, the surgeon will hold his hand, so that he may not run the risk of setting up fever, or of bringing on hæmorrhage from any internal organ that may have been injured.—

vomiting may be allayed by soda water with brandy; or by a large dose of solid opium (gr. ii.); or by an opiate enema (F. 101), or by a mustard poultice (F. 156) to the epigastrium.—*Hiccough* may be relieved by small doses of sp. ætheris comp.—*Convulsions, delirium,* and *coma,* are to be treated according to the state of the circulation: by ammonia and stimulants whilst it is depressed, but by a very cautious leeching, or purging, or application of cold to the head, if they remain *after* the circulation is restored, and the pulse has become firm. In an extreme case it might be worth while to kill a sheep, strip off the skin immediately, and wrap the patient in it. Baron Larrey had seen this done by certain humane Esquimaux, with the greatest benefit, to some shipwrecked Frenchmen that were half dead with cold, fatigue, and hunger; and he put it in practice with equal success in the case of Marshal Lannes, Duc de Montebello, who had been dangerously bruised by a fall from his horse during one of Napoleon's Spanish campaigns.

Finally, the vulgar and mischievous habit of bleeding patients immediately after an injury, before they have recovered from a state of faintness and depression, needs only to be mentioned to be condemned.

CHAPTER II.

PROSTRATION WITH EXCITEMENT, AND DELIRIUM TRAUMATICUM.

DEFINITION.—"Prostration with excitement and exaltation," is the term used by Mr. Travers to signify a state which sometimes follows the collapse from a severe injury.

SYMPTOMS.—The symptoms vary extremely in different cases, although they present the uniform character of *extreme and diffused excitement*, without genuine febrile action. There is great anxiety about the region of the heart: the respiration is oppressed and sighing; the pulse exceedingly rapid and bounding, but soft and compressible; the face is flushed, and there is vomiting. But, in the majority of these cases, the principal feature is the excitement of the nervous system, which is manifested by a peculiar delirium (*delirium traumaticum*) precisely similar to the *delirium tremens*. The tongue is moist and tremulous; there is a general tremor of the muscles; the skin is covered with perspiration; the patient is totally sleepless, irritable in his temper, answers questions in a snappish, or peevish, or incoherent manner; is often anxious to call himself perfectly well; and, as the malady increases, he becomes restless, impatient, and talkative; wishes, perhaps, to get out of bed, and attempts to injure his attendants, and soon becomes most furiously *maniacal*. In some cases, however, *the delirium is of a milder cast; the patient* is haunted with

extravagant ideas and spectral illusions; or fancies himself busied in his ordinary avocations, and talks perpetually about them.

TERMINATIONS.—The *prognosis* will be very unfavourable if the excitement is violent, as that soon leads to coma and death. There will be some hope, however, if the pulse becomes more tranquil and firm, and especially if the patient sleeps.

CAUSES.—The exciting causes of this state are (surgically considered) mechanical injuries acting on weak constitutions, especially in the case of persons of middle age and plethoric habit, who habitually indulge in excess of food and spirituous liquors.

TREATMENT.—The indications are to moderate the excitement, procure sleep, and support the strength.

"If in twelve hours, or earlier, after an injury," says Mr. Vincent, "the pulse does not indicate increased action, if it becomes fluttering and unequal, when the surface does not seem to evolve heat; when the countenance is listless, and the patient reports himself better than it might be expected: and particularly if he is not clear in his answers, then the best of all stimuli, brandy, should be thrown in, and if there be delirium, opium." The opium may be given either in one full dose (such as gr. ii.—iii. of solid opium, or ♏ xl.—lx. of Battley's solution), or in repeated small doses (such as gr. ¼—½, every hour or two hours); the repeated small doses being, perhaps, best, if debility and restlessness are very great. Beef-tea and other mild nourishment should be given, and, if the patient be an habitual drunkard, it will be advisable to allow him to choose his favourite stimulus. Mental excitement is better allayed by one or two kind but firm attendants than by straps and strait-waistcoats. The head should be frequently bathed with tepid water; and the bowels be opened by mild aperients. In cases in which the excitement presents somewhat of an inflammatory character, it may be advisable to try the effects of tartar emetic with the opium F. 68. In the last stage, when coma supervenes, counter-irritation by means of sinapisms or blisters to the scalp, feet, or calves of the legs, may be tried, but scarcely any means will avail.*

CHAPTER III.

SYMPTOMATIC FEVER.

SECTION I.—TRAUMATIC INFLAMMATORY FEVER.

DEFINITION.—That feverish condition which comes on after injuries and accompanies inflammation.

* Copland's Dict. *Art.* Delirium, Graves's Clinical Medicine, 1843, p. 452; Vincent, Observations on Surgical Practice, Lond. 1848, p. 105.

PTOMS.—Shivering; succeeded by increased heat; preternatur-
requent, hard, and vibratory pulse; — pain and aching in the
, back, and limbs, with a sense of lassitude and weakness; —
ral deficiency of the secretions; dry skin; dry and white tongue;
ast; nausea and loss of appetite; constipation; scanty and h
loured urine;—the blood generally buffed and cupped;—slight
ggravation of the symptoms in the evening, often delirium in the
ight, and slight remission in the morning.

TERMINATIONS.—(1.) If the patient recover, the urine becomes
more copious, and deposits a *lateritious*, or brick-dust, sediment; the
tongue becomes moist and clean, the skin cool and perspiring; the
local inflammation either is resolved, or proceeds to a healthy
ration; and the return of the appetite and of the other natural
tions indicates the patient's recovery. (2.) But if from the irreparable
nature of the disease or injury, or from the irritability of the system,
life is destined to be destroyed, the pulse becomes continually more
frequent, and subsequently weak, irregular, and intermittent, the
extremities cold, and life soon ceases with the failure of the circulation.

TREATMENT.—The treatment of this fever will be included in that
of acute inflammation, of which it is the shadow.

PATHOLOGY.—The blood, during this fever, often exhibits certain
appearances, familiarly known by the terms *buffed* and *cupped*. Almost
immediately after a portion has been drawn, it exhibits a thick colour-
less or yellowish-blue layer of liquid on its surface; and when it
coagulates, this appears as a distinct yellow layer, or *buffy coat*, on the
surface of the clot, and usually contracts firmly, so as to make the
upper surface of the clot of much smaller size than the under, and
concave, or *cupped*, in shape. The explanation of these appearances
probably is, that the blood globules have an increased attraction for
each other; that so soon as the blood is drawn, they form themselves
into a sort of meshwork, which contracts and sinks to the bottom,
leaving a layer of liquor sanguinis at the top, the fibrine of which forms
the buffy coat. It is also said that there is an increased quantity of
fibrine in the blood.

In order to show the buffy coat, the blood ought to be drawn
quickly, in a full stream, into a deep vessel, in an apartment, the
temperature of which is tolerably high. If drawn in a small trickling
stream, into a flat and shallow basin, in the cold, the buff may not
show itself.

This condition of the blood appears normal in the horse, in pregnant
women, and in some persons of plethoric habit. It is not, therefore,
any evidence of inflammation. Neither is it, alone, any warrant for blood-
letting; for although it is most common in inflammations of sthenic
type, yet it may occur in asthenic cases (as in acute rheumatism
even after the patient has been too largely bled. It is generally absent
in inflammations of a low erysipelatous type; and it often quickly dis-
appears. Thus, during the process of bloodletting, the first teacupful
taken may display *it abundantly, the second, not at all.*

The entire series of phenomena in this, as in most other fevers, seem to prove, 1. The production of some morbid material in the blood; either through the direct influence of the nervous system disturbed by the injury; or through certain changes occurring in the blood which traverses, or is stagnant in the injured or inflamed parts. 2. A series of operations for the oxidation or destruction of such morbid material; as evidenced by the rapid circulation and increased heat. 3. The elimination of the morbid product, either by means of the pus or other fluids exuded, or by means of some depurative excretion, naturally or artificially produced.*

SECTION II.—IRRITATIVE FEVER.

GENERAL DESCRIPTION.—The term Irritative Fever seems to be conventionally assigned to a form of violent and dangerous constitutional disturbance, which accompanies a poisoned state of the blood.

The *Symptoms* and *Treatment* will be particularised under the head of Dissection Wounds and Phlebitis. The leading features are great restlessness and anxiety, debility, depression of spirits, weight at the præcordia, oppressed respiration; frequent rigors; pulse rapid and sharp, but variable in force; death, preceded by low delirium, and signs of great exhaustion. The treatment must, as a general rule, consist in administering beef-tea and stimulants, the evacuation of depraved secretions, and the removal of pain and irritation.

SECTION III.—HECTIC FEVER.

DEFINITION.—Hectic is an habitual remittent fever, indicative of extreme debility, or of protracted local disease.

SYMPTOMS.—Emaciation and debility; tongue morbidly clean and red, especially at the tip and edges; appetite often inordinate; disposition alternately to diarrhœa and to profuse perspiration, pulse frequent and small;—a febrile exacerbation every evening (or oftener, especially after meals) with slight chills, followed by heat of skin, burning of the soles of the feet and palms of the hands, and a circumscribed flush in the cheeks; thirst and restlessness, preventing sleep till after the middle of the night, when the patient falls asleep, and suddenly awakes in a profuse perspiration;—often buoyancy of spirits and hope to the last.

TERMINATIONS.—(1.) If it be about to terminate fatally, the debility increases; the diarrhœa and perspiration become more profuse

* Vide Hewson, Experimental Enquiry into the Blood. Lond. 1772, chap. ii. pp. 34, et seq. Palmer's edition of Hunter, vol. iii. p. 32, *note*. Thackrah, C. T. on the Blood, Lond. 1834; Davy's Experimental Researches, vol. i. Lond. 1839; T. Wharton Jones, Brit. and For. Med. Rev., Oct. 1842; and Guy's Hosp. Reports; Gulliver, quoted in Ranking's Half-yearly Abstract, vol. i. p. 251; Garrod's Lectures in Lancet, 1848, vol. ii. p. 113; A. H. Hassall's Microscopic Anatomy, vol. i. p. 19; and Paget's Lectures on Surgical Pathology, 1853.

with a few minims of laudanum, during the day; and one or two grains of blue pill, with three or four of rhubarb occasionally, if the liver is inactive. For obstinate diarrhœa, with slimy, bloody, and purulent stools, indicating ulceration of the intestines, the acetate of lead, sulphate of copper, F. 192, and gallic acid may be prescribed. It may be added, that copious injections of warm water give great relief in all cases of diarrhœa; soothing the irritating membrane, washing away acrid secretions, and enabling the patient to pass easily at once what otherwise would occasion several painful efforts.

SECTION IV.—THE TYPHOID VARIETY OF SYMPTOMATIC FEVER.

GENERAL DESCRIPTION.—This is an acute form of constitutional disturbance, occurring when the powers of life are much exhausted or depressed.

SYMPTOMS.—Pulse very frequent and weak, or jerking; skin hot and very dry; all the secretions deficient; tongue dry, brown, and tremulous; lips parched; if there be a wound, it becomes dry, livid, and glassy, and ceases to suppurate.

TERMINATIONS.—(1.) If the patient is to die, the pulse becomes more rapid, thready, and tremulous, and at last is imperceptible at the wrist; the eyes look dull, and glassy, and sunken; the temples and nostrils are pinched, from atony of their muscles;—the patient lies on his back, and sinks towards the foot of the bed;—there is frequent hiccough; the abdomen is tightly distended with flatus, and the sphincter is relaxed, so that stools are passed involuntarily; the patient dozes imperfectly, awaking with a start; he picks imaginary objects on the bedclothes, and mutters to himself; there is starting or twitching of the tendons; at last the skin becomes cold and clammy, respiration slow and laborious, and coma supervenes, soon followed by death. (2.) If recovery occurs, the surest sign of amendment is a diminution of the frequency and increase of the firmness of the pulse, with sound sleep; the patient being sensible and composed, the eyes brighter, the tongue cleaning, and above all, suppuration returning, if there be a wound.

CAUSES.—Typhoid fever may be caused (1) by some circumstance producing immediate and direct depression of vital power; such as traumatic gangrene; a wound poisoned during dissection; or a severe injury or operation suffered by an habitual drunkard. (2.) It may be caused by some disease of long standing, which has completely exhausted the constitutional powers—as profuse suppuration with hectic. And both these conditions may be, and frequently are, combined with a third—namely, (3.) contamination of the blood by putrid or other poisonous matter. Thus it is sure to supervene if putrid pus be confined in an abscess, or if putrid urine escape into the cellular tissue of the perinæum.*

PROGNOSIS.—The prognosis will, of course, be always doubtful;

* See Chronic Abscess.

ut there may be a chance of recovery, if the cause is of recent existence, and admits of removal by operation or otherwise; whilst there can be scarcely any, if the constitution has been exhausted by its long continuance. Thus, if this fever comes on in erysipelas or small-pox, diseases of no long continuance, the constitution may rally;—or if it is caused by a recent injury, or by extravasation of urine, it may be removed, perhaps, by an amputation, or by incisions in the perinæum; but it will scarcely be cured if caused by chronic abscess or disease of a joint, and preceded by hectic. And thus, if the hectic has been suffered to pass into the typhoid state, the season of amputation and hope of recovery are also past. "It is," says Hunter, "the more incurable as it is more connected with the past than with the present."

TREATMENT.—The indications are to remove the cause; allay irritation, and support the strength. If the removal of the cause by operation is likely to be successful, upon the principles just laid down, it should be done without delay; and, even if not, it may be better to try a doubtful remedy than none at all.

As for the general treatment, opium, or some of its preparations, should be given in small doses repeated frequently, or in larger doses at night, according to the judgment of the practitioner, for the relief of restlessness and delirium. The strength must be supported by tonics; by wine, and other stimulants, F. 1, 26, 27, &c., and by broth, beef-tea, arrowroot, &c., if the patient will take them. Hiccough is best relieved by a tea-spoonful of sp. æther, c.; and flatulence by an enema of turpentine, or of confection of rue. The catheter should be used if the patient cannot pass his water: a point that should always be inquired into.

CHAPTER IV.

TETANUS.

SECTION I.—INTRODUCTORY.

DEFINITION.—Tetanus is a disease manifested by tonic or continuous spasm and rigidity of the muscles of voluntary motion.

DIVISIONS.—(1.) It is divided into the *idiopathic*, or that which arises solely from some disorder of the system, and the *traumatic*, or that which is caused by a wound. (2.) It may be *acute* or *chronic*. (3.) It may be *general* or *partial*; and when partial it is mostly confined to the neck and jaws, constituting *trismus*, or locked jaw. (4.) It is called *opisthotonos*, when the body is curved backwards, which it most commonly is; *emprosthotonos*, when it is curved forward; and *pleurosthotonos*, when it is drawn to one side, this being the most uncommon. (5.) The *trismus infantum*, or *neonatorum* which attacks children *soon after birth, is usually made a* distinct species. (6.)

Tetanus may in its *type* be *intermittent*, when it is caused by marsh miasmata, as it may be occasionally, like almost every other nervous affection. (7.) Lastly, there is the *hysterical tetanus;* in which all the outward symptoms of tetanus are produced, as a consequence of an hysterical state of the system.

SECTION II.—ACUTE TETANUS.

SYMPTOMS.—The patient first complains of stiffness and pain of the neck and jaws, as from a cold; his voice is husky; it is difficult for him to put out his tongue, and his countenance is observed to have a peculiar expression, resembling a painful smile, because the corners of the mouth and eyes are distorted and puckered by incipient spasm of the facial muscles. In the next place, the muscles of mastication and deglutition become fixed and rigid with spasm, so that the mouth is permanently closed, and there is great difficulty of swallowing, especially liquids. To these symptoms succeed a fixed pain at the pit of the stomach shooting to the back, and a convulsive difficulty of breathing, indicating that the diaphragm and muscles of the glottis are affected; and the spasm now extends to the muscles of the trunk and limbs, rendering them completely fixed and rigid. The abdomen feels remarkably hard; there is obstinate constipation, and frequently difficult micturition from spasm of the perinæal muscles; the pupils are contracted: and the saliva flows from the mouth, because the patient is unable to swallow it. This spasm never ceases entirely; but it has occasional remissions of violence, alternating with aggravated paroxysms, which are easily induced by the slightest irritation, such as a breath of air, the attempt to swallow, or any bodily movement or mental excitement; there are generally some snatches of relaxation during sleep. Meanwhile the intellect is undisturbed, and the pulse may be natural, except during a severe paroxysm, which quickens it, and causes perspiration and thirst.

TERMINATIONS.—(1.) If the case is about to end *fatally*, the paroxysms become more frequent and violent, and the breathing more and more embarrassed by spasm of the diaphragm and of the muscles of the glottis; and at last the patient dies, either from exhaustion or from suffocation;—either the nervous system being worn out by the violence of the spasm; or the respiration being suspended long enough to cut off the necessary supply of arterial blood from the brain, and so to induce insensibility. The most usual *period of death* is the third or fourth day; sometimes it is postponed till the eighth or tenth, but rarely later. On the other hand, there is the case * recorded of a negro who injured his hand, and died of tetanus in a quarter of an hour; and cases of death within twenty-four hours are by no means uncommon. (2.) When acute tetanus terminates favourably, still the patient's recovery is not complete for weeks or months;—partly because of the

* Rees's Encyclopædia, *Art.* Tetanus.

cuttings and lacerations which the muscles have suffered,—partly because of the remaining tendency to spasm, which very slowly yields, and is apt to be temporarily aggravated by very slight causes, especially cold and damp. But in some rare instances the disease has been removed almost instantaneously by the removal of its exciting cause.

Prognosis.—The prognosis in acute tetanus is extremely unfavourable, especially if traumatic; it is more favourable in the idiopathic, and the chronic generally gets well of itself. Death very seldom occurs after the twelfth day. As a general rule, it may be said that the prognosis is *favourable* if the complaint is partial;—if it does not affect the muscles of the glottis;—if it has lasted some days without increasing materially in severity;—if it is sensibly mitigated by the remedies employed:—if the pulse is not much accelerated;—if the patient sleeps; and if he has been subject to it before in an intermittent form. On the other hand, the prospect will be *unfavourable*, if the spasms continually increase in severity, and especially if they affect the muscles of the glottis.

Diagnosis.—Tetanus resembles *hydrophobia* in the difficulty of swallowing and in the aggravation of the spasms by slight external irritants; but it may be distinguished by the spasms being *continuous*, and by the patient being in general sensible, and calm to the last;—whereas in hydrophobia, there are fits of general convulsions with *perfect intermissions*, and the patient is mostly delirious, with a peculiar wild haggard expression of countenance. *Inflammation of the spinal cord*, or its membranes, resembles tetanus in being accompanied by opisthotonos and spasmodic difficulty of swallowing; but it may be distinguished by the pain in the back and fever being more predominant than in any case of mere tetanus, and by the paraplegia and coma which supervene in most cases.

Morbid Anatomy.—The morbid appearances that have been found in different cases are as follow:—Increased vascularity of the membranes and substance of the *spinal cord*, with or without effusion of serum;—more rarely the same appearances have been found in the cranium;—flakes of cartilage and spicula of bone deposited in the membranes of the spinal cord;—vascularity of the nerves leading from the wounded part;—of the mucous membrane of the stomach; and of the sympathetic ganglia;—and congestion of the lungs. But there is not one of these morbid changes that is constantly, and except the first, there is not one of them that is even frequently, found. The muscles are extremely rigid after death, and ecchymosed or ruptured in many parts;—the blood is mostly uncoagulated.

Causes.—Tetanus may be caused by wounds and external injuries of every description, but especially by lacerated and punctured wounds of the hands and feet, gun-shot wounds, compound fractures, compound dislocation of the thumb, and wounds irritated by foreign matters, or in which nerves are exposed. Mr. Morgan has known it even caused by a blow with a schoolmaster's ferule; but it is very rarely caused by clean simple incisions. *The period at* which it may come on

after an injury is very uncertain. Sometimes it occurs very quickly, if the patient is predisposed to it. Sometimes it seems to be induced by the great pain and irritation of a wound during its inflammatory state: but the most common period is, when the wound is nearly healed.

It is probable, however, that in most instances some concurrent or predisposing cause, in addition to an external injury, is required to produce tetanus. Of such causes, the best established are, 1st., an irritated state of the gastro-intestinal mucous membrane;* and, 2ndly, exposure to cold damp night air during warm weather, or in a warm climate; consequently, tetanus is much more prevalent and fatal in warm than in cold or temperate climates.

The same causes, cold and visceral irritation namely, which predispose to the traumatic, may of themselves produce the idiopathic tetanus. Thus the latter may be a consequence of various visceral irritations, especially of the womb. Whytt gives the case of a girl, aged twenty, who caught cold during the menstrual period, and died of tetanus in eighteen hours; and the author knows a case in which fatal trismus followed uterine irritation, consequent on abortion.†

Tetanus may also be caused by certain poisons, especially the nux vomica.

PATHOLOGY.—The spasms of tetanus affecting as they do all the voluntary muscles, must evidently depend on some morbid condition of that central organ, the spinal cord and medulla oblongata, from which all the voluntary muscles are supplied with nerves. And this morbid condition may depend on *centric* causes, that is, on causes affecting the spinal marrow itself; or on *excentric* causes; that is to say, on irritation of some other part of the body, which irritation is conveyed to the spinal cord by the *sentient* or *afferent*, or, in Dr. Hall's language, *excito-motor* nerves.

With respect to the *nature* of this morbid condition, it cannot be regarded as essentially inflammatory, because the spinal cord is often found after death without a trace of vascularity, and because tetanus may be established during a state of depression and collapse that would be quite incompatible with inflammation.

Although, however, it is most certain that inflammation is not essential to the existence of tetanus, still it is equally certain that there is one class of tetanic cases which presents a well-marked inflammatory character. They commence with shivering and pain, are attended with fever, and, if fatal, display on inspection, congestion,

* For cases arising from intestinal irritation, vide Med. Gaz. vol. i. p. 646; Med. Chir. Trans. vol. vii. p. 459; Ibid. vol. vii. p. 474, et seq.; Abernethy, Lectures on Surgery, London, 1835, p. 23; Travers, Further Inquiry concerning Constitutional Irritation, London, 1835, p. 397; Fournier-Pescay, Dic. de Sc. Méd. Paris, 1821, vol. lv. p. 9; Wincelslai Trnka de Kr'zowitz, Commentarius de Tetano, *Vindobonæ*, 1777; Dictionnaire de Médecine et Chirurgie Pratiques, Paris, 1836, *Art.* Tetanos; B. Gooch, Chirurgical works, Lond. 1792, vol. ii.

† See Cooke's Morgagni, vol. i. p. 129; and the Lancet for June 2nd, 1838.

sion, softening or purulent deposit, in some part of the brain cord.* But this class is a small one.

must be concluded, therefore, that tetanus is merely a manifesta- of functional disorder in one department of the nervous system, that the nearest approach we can make to a correct pathological ition is to say, that it consists in an *unnatural excitability* of the al cord, through which it produces spasm of the voluntary muscles; spasm that is aggravated by the slightest impression on the *sentient* s efferent or *excito-motor* nerves.

TREATMENT.—The rational indications are, first, to remove all exciting causes of irritation, whether caused by a wound, by scybala in the bowels, or the like; 2, to diminish *centric* irritation depending on a diseased or congested state of the cord; 3, to relieve the unnatural excitability, or polarity of the nervous centres;† and 4, to support the strength.

In the *local treatment*, the first points to be accomplished are, to remove all extraneous bodies from the wound, if there be one; to make incisions, if necessary, for the free discharge of pus, or for the relief of inflammatory swelling and tension; and if any isolated portion of nerve or tendon happens to be on the stretch, to divide it. Then the part may be fomented with warm decoction of poppies; after which, a solution of a scruple of opium, or of extract of belladonna in an ounce of water, may be applied on lint, and the whole part be enveloped in large soft poultices. Sundry other measures have been proposed in order more effectually to remove local irritation: such as the division of the principal nerve leading from the wound; or, as Mr. Liston has proposed, the making a \ incision above, so as to isolate it and cut off as much nervous communication as possible; or the destruction of a ragged, contused, ill-conditioned wound by *actual cautery*, as Larrey and others have practised with great benefit: or the *excision of the wound* if cicatrized or nearly so. Sometimes, when the wound is nearly cicatrized, or has ceased to suppurate, the application of a blister or of strong stimulating ointments has been of service; but, as Mr. Curling ‡ observes, it happens, unfortunately, that the tetanic condition of the spinal cord, when fully established is mostly independent of its local exciting cause, and does not cease on its removal. Hence *amputation* of the injured part has very rarely been successful, and has even aggravated the mischief; so that as a general rule, it ought not to be performed, unless desirable for some other reason besides the tetanus.

We must next review the *constitutional remedies* that have been

* For cases of inflammatory tetanus, vide Med. Gaz. vol. i. p. 645; Fournier-Pescap, op. cit.; Burmester in Med. Chir. Trans. vol. ii.; Francesco in Forbes's Review, Jan. 1838; Poggi, Lond. Med. and Phys. Jour. vol. lxi. p. 132.

† Dr. M. Hall's fourth Memoir on the Nervous System, Med. Chir. Trans. vol. xxiv.

‡ A Treatise on Tetanus, being the Jacksonian Prize Essay for 1834, by T. Blizard Curling, London, 1836, p. 122.

employed in tetanus, stating their relative utility, and the cases in which they are most likely to be beneficial.

1. *Antiphlogistic measures.*—Bleeding may be used if there is satisfactory evidence that the disease is dependent on, or accompanied by, inflammation of the spinal cord, and not otherwise.

Mercury, given so as to induce ptyalism, has often appeared to do good; but this is doubtful. *Active Purgatives* are generally indicated. Thus, a powder of calomel and jalap mixed with butter may be put at the back of the tongue, for the patient to swallow, and should be followed in an hour with a large dose of castor oil, or by a drop or two of croton oil; and enemata of turpentine may be administered until the bowels are completely unloaded. The circumstances which forbid the use of purgatives, are previous disease of the alimentary canal; dysentery, ulcers, &c.; but even then there would be no objection to castor oil and unirritating enemata.

2. *Sedatives.*—Tobacco has the credit of being one of the most efficacious remedies in tetanus; but it is so fatal a poison in an overdose, and chloroform so much more likely to do good, that we cannot advise the surgeon to resort to it.

Cold is of eminent service to animals affected with tetanus; and a soldier was once most unexpectedly cured by exposure all night in severe weather. It may therefore do good to apply cold extensively to the spine by means of bladders, or ox-gullets filled with ice, or with various frigorific mixtures; taking care to support the circulation by internal stimulants.* But the cold bath, and cold affusion, although they are of great service in chronic tetanus, are most hazardous in the acute, and have more than once proved instantly fatal.

3. *Narcotics.*—Opium is of most undoubted efficacy in some instances, probably those attended with a painful wound, and weakness. When it produces good effects, they are soon manifest. It may be given in large doses, in the form of enema or suppository.

4. *Chloroform.*—This is the most promising remedy, and in several cases has been of real service; in others, on the contrary, either the remedy has soon lost its power of mitigating the spasms; or else, although the spasms have been subdued, the patient has died, either from exhaustion or from some inscrutable alteration in the nervous centres.†

The *resin of the Cannabis Indica*, has been employed with very good effects, by Dr. O'Shaughnessy and others at Calcutta, and by several practitioners in this country. The dose is gr. iij. every half hour till the symptoms are mitigated (F. 29).

5. *Stimulants and Tonics.*—The preparations of iron and bark have been useful in cases attended with marked debility. Several cases are

* See some observations by Dr. Todd, quoted in Ranking, x. 33.

† See two cases by Dr. Cotton of Lynn, Prov. Med. Journ. May 15, 1850; fatal, though sufferings relieved by ether and chloroform inhaled; case by Mr. Sloman of Farnham, quoted in Ranking's Abstract, x. 36; chloroform soon lost influence; patient recovered under calomel and morphine.

in all in which recovery followed the use of ardent spirits in very large quantities.* Phosphorus given in the quantity of one grain in divided doses, gradually increased to four, is also said to have effected a cure in twelve days.

It is very important to protect the patient from all irritation and disturbance. He should be kept quiet and in the dark; and the administration of remedies should be managed so as to cause as little annoyance as possible. The evacuation of the bowels should be effected thoroughly once for all; and the patient be cautioned against speaking, moving, or swallowing oftener than he can help.

Lastly, in a disorder the nature of which is yet so obscure, the conscientious surgeon will take care to do no harm, if he can do no good. The most positive and hopeful plan, in idiopathic cases, is the thorough evacuation of the bowels. This should also be attended to in traumatic cases; taking care in both not to use too violent remedies. Then chloroform inhalation, or cold to the spine, or morphia, or hellebore in cautious doses, should be tried in order to mitigate the spasms; and in every case the inevitable tendency to exhaustion should be kept in view, and be combated by food, by fermented liquors, and by quinine and other tonics. When there is much difficulty of swallowing, both nourishment and medicine must be administered by enema, or by passing a tube through the nose down the œsophagus.†

SECTION III.—CHRONIC, INFANTILE, AND HYSTERICAL TETANUS.

CHRONIC TETANUS is very seldom fatal, although in some rare instances the patient has died completely exhausted by its long continuance; for it sometimes lasts several weeks. The principal remedies are aperients, tonics, chloroform, and the shower-bath. The bowels should be kept freely open, but not by too drastic medicines. Electricity, in the form of sparks, or weak shocks down the spine, would probably be of service.‡

TRISMUS INFANTUM is a form of tetanus which is almost unknown in England. It was formerly, however, exceedingly prevalent in Ireland, and appears to be met with there occasionally even at present. It carries off a vast number of children in the West India Islands; and we learn from Dr. Holland, that in the desolate rocky Vestmann islands, on the south coast of Iceland, one hundred and eighty-six infants perished of it in twenty-five years, although the population does not exceed one hundred and fifty souls. The causes appear to be, want of ventilation, and filth, or the innutritious and unwholesome

* See two cases in the Lancet for 1845, vol. i.

† For an account of the proposal to cure tetanus by inoculation with the Woorali poison, see Waterton's Wanderings; Brodie's Papers in the Phil. Trans. for 1811, p. 178, and 1812, p. 205; and Morgan's Lecture on Tetanus.

‡ Holland, Med. Notes and Refl.; and Addison on Electricity in Convulsive Diseases, Guy's Hosp. *Rep. vol. ii.*

diet of the parents, such as the fish and sea-bird eggs that form th... only sustenance of the Vestmann islanders; and the use of irritating applications to the wound left by the falling off of the navel-string. The time at which the disease appears is generally from the fifth to the tenth day after birth; hence the popular Irish term, *nine-day fits*.

The *symptoms* are, locked jaw, spasmodic difficulty of breathing and swallowing, and general convulsions. They are almost invariably attended with diarrhœa, and preceded by fretfulness, startings during sleep, and unusual greediness for the breast.

Treatment of any kind is seldom successful; but it may be presumed that the warm bath, four or five doses of calomel (gr. i.—ii.) at intervals of four or five hours, a teaspoonful or two of castor oil to clear the bowels, and minute doses of laudanum (one-eighth of a minim cautiously increased) every two hours afterwards, or chloroform, are the measures most likely to be of service.*

HYSTERICAL TETANUS.—It is one characteristic of hysteria, that it frequently assumes the more palpable outward symptoms of various diseases, so as to simulate them pretty completely; although proper investigation may always detect the real features of hysteria, under any mask whatever. Thus an hysterical female may be seized with stiffness of the muscles of the face and jaws, which may extend to the neck, and gradually invade the trunk and limbs, so as completely to close the mouth, and render the whole body rigid and motionless. The chief points of diagnosis are, the hysterical state of the mind; and the fact that the muscular contraction, however great, may almost always be overcome for the moment by forcing the patient to exert her volition. The best remedies are warm aloetic purgatives and turpentine enemata, and valerian, galbanum, and other antispasmodics of that class.

CHAPTER V.

CONVULSIONS.

IN order to complete the view of general disorders produced by local injury or disease, it is necessary briefly to allude to *convulsions*, occurring in epileptic paroxysms. These are familiar in *medical* practice, when arising from irritation of the gums, of the stomach, of the uterus, &c.; they also occur occasionally from some of the local affections which custom has assigned to the surgeon. In particular, they

* See a paper by Joseph Clarke, M.D., in Med. Facts and Obs. vol. iii. Lond. 1792; Dr. Holland's Med. Notes and Reflections, 2nd Ed. p. 29; Maunsell and Evanson on Diseases of Children, 4th ed. Dublin, 1842, p. 219; and Maxwell on Yaws and Tetanus, Edin. 1839.

ment, the following are the main indications. 1. To search remove, or soothe any external source of irritation. 2. To disordered secretions. 3. To lessen accumulation of blood in l organs of the nervous system, if it exists, as indicated by , and turgid lips, eyes, and countenance. Ice to the head, ard to the feet are almost equivalent to a cupping. 4. In the lass of cases, with feeble pulse, pale face, and dilated pupil, to cautiously, and to administer opium or chloroform. 5. In give sufficient nourishment.

PART II.

ELEMENTARY PROCESSES OF LOCAL DISEASE.

CHAPTER I.

MALFORMATION, HYPERTROPHY, ATROPHY, AND OTHER DEGENERATIONS OF TISSUES.

I. CONGENITAL MALFORMATION.—In the present part of our work we propose to give a general view of the various forms of local disease, which may be met with in any part of the body, from any cause interfering with the regular processes of nutrition and function. Amongst these, the earliest in point of time, are the various original malformations, which occur through some inexplicable defect in the vital powers of the germ out of which the fœtus is developed. Of such malformations, some depend on an *arrest of development*, through which various organs, or parts of organs, are left, as it were, incomplete and unfinished. Such are the cases, which come under the surgeon's notice, of *spina bifida*, or incomplete closure of the arches of the vertebræ; such are *hare-lip* and *cleft-palate*, which arise from a similar condition of the bones and soft parts of the face;—such, too, are *epispadias*, and *hypospadias*, or incomplete closure of the receptacle and ducts provided for the urine. From a like want of development, though the immediate effect is opposite, arise the conditions of *imperforate anus*, or *vagina*.

Other cases of congenital deformity are caused by local *excess of development;* such as, for instance, supernumerary toes and fingers. Others again rise from defects in the relative position of twin ova; so that one fœtus becomes adherent to the other; or even becomes included within the body of the other.

Of the causes and prevention of congenital deformities, it is not worth while to speak. Of the treatment of such as are capable of relief by surgical means mention will be made in PART IV., in the chapter devoted to the organ in which each variety may occur.

II. INTRAUTERINE DISEASE.—Children are sometimes born with

...which ought to be distinguished from this ...
...preceding paragraph, as they ...
...the original power of development, but ...
...to forms, which present within the ...
...normal power at any other period of life. ...
...bent, and dislocation of the hips ...
...of spontaneous amputation, so called, of ...
...foot becomes slightly extended ...
...the accidental bend of lymphatic ...
...disposition.

...HYPERTROPHY.—This term signifies ...
...overswelling of an organ, but an increase ...
...above its healthy structure. ...hypertrophy, ...
...accompanied with increased *development*; that is, with ...
...of a higher order of structure, so that the hypertrophied ...
...new and greater powers. It is, generally speaking, ...
...conservative process, whereby the hypertrophied ...
...more than its ordinary share of duty, and to compensate ...
...defect in some other part of the economy.

"The causes are," as Mr. Paget observes, "chiefly two: 1. Increased exercise of a part in its natural functions; 2. An increased supply of healthy blood; 3. An increased reception of the particular materials which any part supplies in nutrition, or in secretion."

1. Instances of hypertrophy from the first cause are afforded by the bladder, which, in cases of obstruction to the urine, becomes greatly more capacious, with its muscular coat developed into a state of greater power, that is, to resist the increased pressure they are obliged to bear and to overcome. The skin is thickened into corns by pressure and friction; and the cellular tissue is developed under like conditions, in the cellular tissue.

2. Instances of hypertrophy from increased supply of blood are afforded by the growths of hair which occur in the skin in the neighbourhood of ulcers; and by the enlargement of the bones of a limb of a growing child, when a vascular ulcer of the skin, or disease of the joint, has for a considerable time caused an unusual quantity of blood to circulate in the vicinity.

3. Hypertrophy caused by a particular function is exemplified in the increase of one kidney, when the other is incompetent, through disease or injury, to the secretory matter from the blood. The ossifications which occur in the legs of certain breeds of horses are owing probably to this cause, as perhaps is goître; the obesity of great eaters, etc.

4. Lastly, hypertrophy arises occasionally from an increase of the vital power of growth or development, whereby a part, or of the fatty tissue will *grow disproportionately to the rest of the body, and form a tumour.*

f hypertrophy must consist in removing the cau

is the reverse of hypertrophy; it is the wasting o

ATION.—This may be defined to be the loss of
l characteristics of an organ; or the substitution
er form of tissue; so that degeneration differs fi
though some amount of it is often superadded.
ns of degeneration are—1st. The *chief*, in which th
t of fatty tissue, occupying the place of muscle, or so
sue.
fibrous, in which fibrous tissue is substituted.
fatty, or *oily*, which does not consist in development
but in decay of the proper substance and structural ch
rgan, and its conversion into a mass of granules, mixe
les and crystals of cholesterine.
earthy, or calcareous, in which there is an infiltration wit
r, consisting of carbonate and phosphate of lime, wit
gnesia.
degeneration is liable to affect the muscles, and particularly
it may occur in the cornea of the aged, the lungs of th
tous, the kidneys of those who die of Bright's disease, and i
ty of cell growth and tumour. It has no particular con-
h general obesity; for examples of fatty degeneration o
ans may be found in bodies which otherwise are extremely

uses of atrophy and degeneration are—1st. Disuse, or want of
which is sure to cause any organ, be it brain or muscle, to waste.
Diminished supply of blood may in some cases cause atrophy,
hers it causes ulceration or gangrene; but an organ whose
is active is almost sure to attract blood enough to itself, if
no utter physical obstacle to the current.
r. Deficiency in the blood of the materials necessary for healthy
and nutrition of an organ is a third cause. This may be ex-
ied by the atrophy of bone and muscle when there is an insuffi-
supply of food, or when the materials necessary for them are
d by undue secretion.
dly. Deficient vitality;—deficiency of that power by which every
is enabled to maintain its growth, and to abstract from the blood
aterials for its nutrition. This again may be caused by exhaus-
—by excessive fatigue;—by over use or abuse of a part;—by
e (especially by inflammation, which has spoiled its tissue;—by
es to the nervous centres or trunks supplying it; and, lastly, it
ntly happens that when the vital powers of the whole body are
igh exhausted by illness, by starvation, or by exposure to cold, one
ular organ may be irretrievably blighted, though the remainder may
r their accustomed health. The atheromosis which occurs in aterial
ts, and the wasting of one leg or arm after fever are instances.

breasts after delivery. It is equally necessary to many morbid actions; it forms one of the first and most palpable effects of inflammation; it is witnessed in blushing; in the condition of the blood-vessels of the intestines in malignant cholera; in headaches and apoplectic attacks from excitement; and in the immense afflux of blood to the uterus, and consequent hæmorrhage from ovarian excitement.

2. *Passive congestion* signifies a stagnation of blood in a part, especially in its veins. It may be a consequence of mechanical obstacle to the return of blood; or of atony and want of vital contractility in the capillaries, especially if they have been previously subject to great distension or excitement. It is evidenced by a sense of weight and aching pain, and is very liable to lead to serous effusion, and to ulceration or gangrene.

There are two causes of peculiar force in producing local accumulations of blood. One is, mental emotion, the effects of which in directing a torrent of blood to the uterus are well known; whilst it is not less true that the act of fixing the attention strongly on any organ whatever, in either sex, is sufficient to derange its circulation. The other is, impurity of blood. Let the blood be impure from any cause whatever, from the presence of bile, urea, or lithic acid, or even let it be deficient in its proper constituents, and local congestions are sure to occur. The headaches that accompany biliary disorder, and the serous effusions which follow Bright's disease, are examples. The *treatment* of these cases must comprise the purification of the blood: the removal of mental causes; the local abstraction of blood; the application of cold; and, in passive cases, of stimulants and bandages.

II. NERVOUS PAIN.—As all redness is not inflammation, so neither is all pain. Pain may arise from muscular spasms or cramp, or from some diseased condition of the nerves, or of the nervous centres, without the existence of the least inflammation. Such pain, nervous pain, as it is commonly called, may often be known by its capriciousness; by its coming and going without apparent cause, or with no other cause than the patient's mind being directed to it. It is often intermitting and periodical. It is often relieved by measures that would aggravate inflammation, such as stimulants, pressure, and friction; and almost infallibly aggravated by leeches, blisters, and other remedies that would relieve inflammation if it existed. It is often intense in proportion to the anæmic and debilitated condition of the patient. It is often intense out of all proportion to heat, swelling, and redness, even if they are present at all. In its character it is often violently plunging or shooting, and is compared by the patient to the running through of a red-hot wire, or the passage of an electric shock. It may last for weeks or months without being followed by any of the changes of structure which are commonly called inflammatory. Lastly, it may be felt in parts quite remote from any morbid action, or may be referred to parts of the body destitute of sensation (thus after fracture of the spine severe pain has been felt in the legs, though quite insensible to the

, or may be referred to parts that have no existence, of which the lt in limbs long since amputated may be an example.
treatment of this condition will be found in Part IV., under the f Neuralgia.

CHAPTER III.

GENERAL PHENOMENA OF INFLAMMATION.

FINITION.—Inflammation may be defined to be a state of altered ion, attended with increased sensibility and vascularity, and with ency to certain definite changes of structure.
that in the idea of inflammation, three things are combined. n altered state of nutrition or vital force. 2ndly. A state of æmia, or afflux of blood. 3rdly. Certain further changes, some from the primary operation of the cause, some resulting secondfrom the afflux of blood.
MPTOMS.—The symptoms are redness, pain, heat, and swelling, impaired function of the inflamed part;—and each of these symprequires a few observations in detail.
) The *redness* is owing to the increased quantity of blood in the ied part; the smallest capillaries being distended with red particles. inflammation is acute, the redness is of the bright scarlet tint of al blood; when chronic, it is of a darker venous hue; and in cerpecific inflammations it is purple or copper-coloured. Again, in ion inflammation, it is gradually diffused, and lost in the neighng parts, whilst in some forms of specific inflammation* it is dly circumscribed.
) The *pain* of inflammation may be attributed partly to the disn of the blood-vessels, but chiefly to that disorder in the vital is, be it what it may, in which the essence of inflammation con-
It differs in its character and intensity according to the cause acing it, and the part which is affected. Thus it is burning or ng in the skin; throbbing in the cellular tissue; sharp and lancig in the pleura; a mere sense of heat and soreness in the bronchial us membrane; and extremely dull and oppressing in a part supwith ganglionic nerves; as the stomach, kidneys, or testicles. It ays less severe if the fluid products of inflammation can readily e, than if they are confined;—and comparatively slight if the part ned be yielding and extensile, but most severe if it be hard and , as bone or ligament; although these structures possess very little ility in health. It is sometimes felt at a distance from the ind part; thus pain in the shoulder is often the first symptom of ned liver, and pain in the knee of diseased hip. Lastly, it may be

* *Hunter's Works by Palmer, vol. iii. p. 330.*

x terminations, or *effects* are commonly enumerated. 1. *age.* 2. *Effusion of serum.* 3. *Effusion of fibrine*, or *plas-*. 4. *Suppuration*, closely allied with which is the change *mollissement*, or softening. 5. *Ulceration.* 6. *Mortification.* of these effects a chapter will be devoted.

ED ANATOMY.—The ordinary *post mortem* appearances of inflammation are, redness, softening, swelling, and infiltration rum. It is necessary, however, to observe that redness may, first place, disappear altogether after death: *secondly*, it may ulated by redness from congestion which existed during life— irdly, it may be simulated by certain appearances produced leath, through the gravitation of the blood to the most depending ins, and through the transudation of the serum and colouring r through the coats of the vessels in incipient putrefaction: which mpent causes of red spots and stains on internal surfaces, and llections of bloody serum in the various cavities. Therefore, n, swelling, softening, and serous effusion must not be hastily red as evidence of inflammation, unless accompanied by some more ol effect, such as lymph or pus.

RIETIES OF INFLAMMATION.—Inflammation may be divided— nto *healthy* and *unhealthy*, or *low*. Of the former, the effect of a le injury on a healthy person, whose diet is too stimulating, is a example. It is concentrated towards the injured spot, and subsides ly when the cause is removed. The low, or unhealthy, is marked disposition to spread, and an unwillingness to subside: it is usually d either by some poison, or by a vitiated state of the blood; and lymph effused is more prone to disintegration than to development.

entirely absent; as when inflammation occurs in a healthy constitution, and merely produces adhesion; so that adhesions are often found between the pleuræ after death, that never were suspected during life;—or when inflammation, although disorganising, is very insidious and indolent, as in scrofula;—or when the patient's mental and physical sensibilities have been benumbed by the habitual use of intoxicating liquors;*—or when the nervous system is stupified by the influence of poisonous blood in fever;—or when the part inflamed is deprived of its nerves of sensation.

(3.) The *heat* of inflammation was supposed by Hunter to be a mere effect of the increased afflux of blood. For it is most remarkable in inflammation of those parts which are farthest from the heart, and naturally the coldest; and in them it often does not rise so high as the mean temperature of the blood; whilst in inflammation of internal parts, whose heat is uniform, and not depressed by external vicissitudes, it sometimes does not rise at all. We may, however, suppose with Liebig, that, together with the increased afflux of blood, there is also a more rapid oxidation of the tissues of the inflamed part, or of morbid material circulating with the blood, which will of necessity produce a greater evolution of heat.†

(4.) The *swelling* is caused at first by the increased quantity of blood, and subsequently by the effusion of serum, blood, lymph, and pus. It is most remarkable in loose textures; also in the breast, testicle, and lymphatic glands.

(5.) The *impairment of function* which inflammation produces, consists at first in an increased irritability and morbid sensibility of external impression; but, subsequently, of an utter incapability of performing the usual offices, in consequence of structural change. Secretion, properly so called, is diminished by inflammation.

(6.) The *structural changes* produced by inflammation resolve themselves into, 1st, certain changes which take place in the minute elements of the part affected; 2dly, changes which consist in the intrusion of an unusual quantity of blood, in the infiltration of the inflamed tissues with various fluids exuded from the blood; and in the subsequent changes which these exuded fluids undergo, either towards development, or towards disintegration. The first class of changes includes, 1st, *softening*; a real loss of cohesion, quite independent of infiltration with liquid, and found in bones and ligaments, as well as in softer tissues; 2dly, various molecular changes, such as the enlargement of the cells, and splitting up of the intercellular substance observed by Dr. Redfern in in-

‡

* Latham, Lectures on Subjects connected with Clinical Medicine.—Lect. iv.
† James on Inflammation, p. 239; Macartney on Inflammation, p. 14; Latour, Revue Med., Jan. 1840; Liebig, Animal Chemistry, p. 254.
‡ A portion of inflamed muscle, infiltrated with lymph, and beginning to show fatty degeneration.

jured cartilage; and above all, confusion of the characteristic structural marks, and infiltration with oil globules; in other words, a real fatty degeneration, followed by liquefaction and absorption of the inflamed tissue. The second series of changes are popularly known under the terms—

EFFECTS OR TERMINATIONS.—Inflammation has only one genuine *termination*, namely, *resolution*, or recovery;—but, beside this, the following six terminations, or *effects* are commonly enumerated. 1. *Hæmorrhage*. 2. *Effusion of serum*. 3. *Effusion of fibrine*, or *plastic lymph*. 4. *Suppuration*, closely allied with which is the change called *ramollissement*, or softening. 5. *Ulceration*. 6. *Mortification*. To each of these effects a chapter will be devoted.

MORBID ANATOMY.—The ordinary *post mortem* appearances of recent inflammation are, redness, softening, swelling, and infiltration with serum. It is necessary, however, to observe that redness may, in the *first* place, disappear altogether after death—*secondly*, it may be simulated by redness from congestion which existed during life—and *thirdly*, it may be simulated by certain appearances produced after death, through the gravitation of the blood to the most depending situations, and through the transudation of the serum and colouring matter through the coats of the vessels in incipient putrefaction; which are frequent causes of red spots and stains on internal surfaces, and of collections of bloody serum in the various cavities. Therefore, redness, swelling, softening, and serous effusion must not be hastily received as evidence of inflammation, unless accompanied by some more decided effect, such as lymph or pus.

VARIETIES OF INFLAMMATION.—Inflammation may be divided—1. Into *healthy* and *unhealthy*, or *low*. Of the former, the effect of a simple injury on a healthy person, whose diet is too stimulating, is a fair example. It is concentrated towards the injured spot, and subsides readily when the cause is removed. The low, or unhealthy, is marked by a disposition to spread, and an unwillingness to subside; it is usually caused either by some poison, or by a vitiated state of the blood; and the lymph effused is more prone to disintegration than to development. 2. Into *common* and *specific*; the common arising from ordinary causes acting on ordinary constitutions;—the specific arising either because the constitution is unsound, as in scrofulous, gouty, or rheumatic persons, so that (to use Hunter's words) it gives or reflects back upon the part inflamed a diseased disposition or action;—or because it is produced by a cause which is specific; as the poisons of small-pox or syphilis. 3. It may be divided into *acute* and *chronic*; the acute being sudden in its seizure, violent in its action, and rapid in its progress;—the chronic being less violent and more tardy. Acute inflammation is sometimes called *active*; and the term *passive* is applied to chronic inflammations in weak constitutions. 4. It may be classified according to its tendency to produce particular local effects; thus we speak of adhesive, suppurative, hæmorrhagic, ulcerative, and gangrenous inflammation.

TENDENCIES OF INFLAMMATION.—The tendency of inflammation to various effects, is influenced, 1. by the *structure of the parts* which it invades; for in the serous membranes, parts which have no natural outlet, it is more disposed to produce adhesion than suppuration. But in the mucous membranes, it tends to produce suppuration before adhesion. The final cause of this is evident if we consider the danger that would ensue if the mucous canals were closed by adhesive matter, from the slight inflammations to which they are perpetually subject. 2. The tendencies of inflammation are chiefly influenced by the specific cause producing it. This point is very clearly stated by Dr. Budd.* Take inflammation of the knee-joint for an example. If caused by a penetrating wound, with admission of air, rapid suppuration and destruction of the joint usually follow. If caused by the presence of pus, or decaying fibrine in the blood, there will be little swelling, but suppuration so rapid as to encourage the belief that the pus, instead of being formed in the joint, is brought there. If caused by rheumatism, there is severe pain, and much effusion; but that effused fluid is never purulent, and is almost always absorbed as the patient recovers. If of gouty origin, there is more pain, and considerable effusion, which is apt to leave particles of lithate of soda behind in the synovial membrane, and in the areolar tissue around. If a consequence of gonorrhœa, there is abundant effusion, and great swelling, very difficult to get rid of.

PREDISPOSING CAUSES.—These are, in the first place, excess of food and drink, or of bodily or mental exertion, respiration of impure air, insufficient exercise, imperfect action of kidneys and skin, and whatever other causes produce either an excessive quantity, or an impure state of the blood. When inflammation arises from these causes alone, it is said to be spontaneous, or idiopathic, or constitutional. The local causes which predispose any given part to suffer, are chiefly over-stimulation or exertion beyond power; previous disease, and original weakness of organization.

EXCITING CAUSES.—These are injuries of all kinds; whether external, as mechanical or chemical; or internal, as over-exertion and excessive wear and tear of tissue; or deposit of morbid matter derived from the blood. Lastly, causes may be *common* or *specific*;—the former being those which are daily met with, and which can act on all constitutions;—the latter being unable to affect all constitutions, being peculiar in their origin, and producing a specific train of consequences. The vaccine virus may be an example.

MICROSCOPICAL OBSERVATIONS.—From the most careful microscopical observations made by Paget and Wharton Jones on the web of the bat's wing, we may gather the following particulars, which may be very rationally applied to explain some of the phenomena of disease.

1. The primary effect of a slight stimulus applied to the blood-vessels, is a slight and temporary *contraction*, with a *retardation* of the

* On Diseases of the Liver, 2nd ed. Lond. 1852, p. 65.

current through them. If the point of a fine needle be drawn across a minute artery and vein three or four times, without injuring them, or the membrane covering them, they will both presently gradually contract and close. This contraction is no doubt analogous to the speedy closure of the innumerable small vessels divided in a wound, which are made to contract by the very stimulus of the instrument which has divided them.

2. During this contraction, the blood moves more slowly, or perhaps does not move at all. But when the vessels dilate again, they acquire a larger size than they originally had, and the blood moves more freely and rapidly through them than it did before. And now the same stimulus that made them contract at first, has no effect, or a very transient one; a more powerful stimulus, however, may make them again contract and close.

On applying a more powerful irritant, such as a drop of tincture of capsicum, the preliminary contraction, if it occur at all, is so transient as to be hardly perceptible, but the phenomena of *active congestion* or *determination of blood* become instantly developed. The blood-vessels become rapidly dilated, lengthened, and tortuous; sometimes even they display varicose or aneurismal excrescences; they are densely filled with blood, containing a large excess of red globules, which is circulated with far greater velocity than is natural.

3. But if the injury inflicted be of still greater severity, as a wound with a red-hot needle, then in addition to the preceding state of active congestion, there follows, in the very focus of the morbid changes, a retardation, and, at last, a complete stagnation of the blood in the densely-crowded capillaries. "All round this focus the vessels are as full, or nearly as full, as they are in it; but the blood moves in them with a quicker stream, or may pulsate in the arteries, and oscillate in the veins; yet farther from this focus the blood moves rapidly through turgid but less full vessels." The dusky colour in the centre of a phlegmon; the throbbing; the red blush around; the gush of blood on cutting into it, are thus fully explained.

After this, the liquor sanguinis, stained with the colouring matter of the globules, begins to be exuded into the interstices of the tissues. Or perhaps the blood-vessels are ruptured, and a small quantity of blood becomes extravasated (*hæmorrhage*). If the inflammation continue, the tissues become completely broken down and disorganized at the points where the inflammation is most intense, and pus is there formed out of the exuded lymph (*suppuration*). If the inflammation increases in severity, the stagnant blood coagulates in the vessels, the tissue becomes soft and flaccid, and in fact *mortifies*.

THEORY OF INFLAMMATION.—The older writers always looked upon the blood-vessels as the seat and instruments of the inflammatory process, just as they also spoke of the vessels as the instruments of organization, secretion, and the other vital processes in health and disease. A more correct physiology, however, teaches us that they are but the

channels by which materials are conveyed to the various organs and tissues, there to be attracted, assimilated, converted, and modified, and then returned, according to the processes going on in those organs and tissues, by virtue of their own living properties; and that tissues, such as articular cartilage and the cornea, are subject to inflammatory changes, though they have no vessels whatever.

We are thus compelled to take from the capillaries the office which has been so long assigned to them as the *factors* of inflammation. But yet a great afflux of arterial blood is a most important instrument in the changes which inflammation produces, and the prevention of it is one of the most efficient means for controlling those changes. And there is little doubt but that the lax state of the blood-vessels in a chronically inflamed part is often one great obstacle to a perfect recovery.

Reparative Adhesion.—Assuming, then, that in a state of health every part has the power of attracting, from the nearest capillaries, the materials for its own nourishment and functions, we may believe that when a simple injury is inflicted, there is also the power of attracting the material, in the shape of plastic lymph, by which the breach is repaired. This process, in favourable cases, takes place—perhaps with the aid of slightly-increased determination of blood—but without any symptom which can fairly be called inflammatory. *Vide* chap. viii.

Inflammatory Adhesion.—If the injury has been such as to cause severe or continued disturbance to the vital forces of the part, there may ensue considerable inflammation, with greater effusion of lymph, which is ultimately converted into fibrous tissue.

Suppuration and Ramollissement.—But if the amount of injury be still more severe, or if the blood be unhealthy, or the afflux of it too copious, the exuded lymph, instead of developing itself into fibrous tissue, softens down into pus, or puriform fluid.

Ulceration and Gangrene.—Under still more unfavourable circumstances, the tissues, gorged with blood and effused fluids, perish: if in mass, they are said to mortify; if they disintegrate in detail, they are said to ulcerate.

Idiopathic Inflammation.—The most rational theory we can frame, to explain the phenomena of an inflammation of constitutional origin, is, that it consists in the determination, to some one part, of blood loaded with poisonous matter, which is there deposited with some one or more of the constituents of the blood, as serum or fibrine. The phenomena of a fit of the gout, of the small-pox, and of phlegmonous erysipelas, are easily explicable in this way. In fact, the researches of Mr. Henry Lee, on the effects of decomposing fibrine when mixed with the blood of a living animal, seem to furnish experimental evidence of the manner in which local inflammations occur when the blood is poisoned with the matter of gout or syphilis, or with the virus of erysipelas or carbuncle.*

* Vide Cullen's First Lines, book ii. chap. i. sect. 2; Thompson's Lectures

CHAPTER IV.

ACUTE INFLAMMATION.

DEFINITION.—Acute inflammation is that which is sudden in its origin, violent in its action, and rapid in terminating; and it is attended with fever, either if it be considerable in its extent, or if it affect parts of great sensibility and importance, or if the nervous system be highly irritable, or the blood impure.

TREATMENT.—The chief indications in every case are, 1. If possible to remove the cause. 2. To allay and soothe the primary disturbance of vitality and sensibility in the injured part. 3. To moderate the afflux of blood. 4. To control the molecular changes which occur in the fluids exuded. 5. To eliminate from the blood the source of morbid effusion.

We may observe at the outset, that the surgeon should always estimate the natural tendencies of the disease. He should consider the necessity, which there is in some cases, of immediate relief, in order to save life; whilst in other cases the disease tends to run a certain course, and then decline of itself; and the possibility there is in some cases, of removing the disease entirely, in others, of only mitigating it.

I. BLOODLETTING.—Since the use of the lancet is often a matter of life or death, the general doctrine of bloodletting cannot be too thoroughly studied. If blood enough be taken, there is indeed a state of insensibility and suspended circulation, to which the name *syncope*, or *fainting*, is given. Now it requires to be understood, that this suspension of the heart's action depends upon two causes; *first*, on the abstraction of its natural stimulus, the blood;—*secondly*, and principally, on a peculiar sedative influence, transmitted to it from the brain, when the latter does not receive its due share of arterial blood. And although the mere loss of blood *per se* may be of service (when that fluid is morbidly abundant) by relieving the system from a source of excitement, still the principal good effects of bleeding in inflammation depend on its sedative effects through the brain on the heart and arteries. And it is of importance to produce as much of that sedative effect with as little loss of blood as possible.

Manner of Bleeding.—For this purpose the blood should be drawn

on Inflammation; Gendrin, Histoire Anatomique des Inflammations; Andral, Anatomie Pathologique; Travers on Inflammation, Lond. 1844; Mayo's Outlines of Physiology, 5th ed.; J. W. Earle in Lond. Med. Gaz. vol. xvi.; Kaltenbrunner de Statu Vasorum et Sanguinis in Inflammatione, 1826; the Lecture on Inflammation in Graves's Clinical Medicine; T. Wharton Jones in Brit. and For. Med. Rev., Oct. 1842; J. Hughes Bennett, Treatise on Inflammation, Edinburgh, 1844; Goodsir, Anat. and Path. Obs. Edin. 1845; and Paget's Lectures, Med. Gaz., June, 1850.

as quickly as possible, from a large orifice; and, above all, the patient should sit or stand upright. For if the blood is drawn slowly, so that the vessels have time to adapt themselves to their diminished contents or if the patient is in the recumbent posture, which tends to assist the flow of blood to the brain, the bleeding may be carried almost to death without the occurrence of faintness.

Quantity to be taken.—As a general rule, the blood should be permitted to flow till paleness of the lips, lividity round the eyes, sighing, nausea, fluttering pulse, and relief of the pain, indicate the *approach* of syncope; but the syncope should never be induced.

Tolerance.—The tolerance, or power of bearing bleeding without fainting, varies according to the age, sex, and temperament of the patient, and to the *epidemic constitution*, or prevailing nature of disease. Thus it is believed that, in one period of years, diseases have an active sthenic character; that they require bleeding, and bear it well; but that in other periods, of which the years 1847–50 are examples, disease of all kinds has a low asthenic character, and bleeding is not required and not tolerated. The tolerance is besides affected most remarkably by the existing disease. Thus it has been ascertained by Dr. Marshall Hall that 15 oz. is the average quantity that will produce syncope in a healthy adult if blood whilst standing upright; but that in some diseases much more requires to be taken, and in others much less.

The diseases in which bleeding is best borne, are inflammations of the head, or of other vital parts. Those in which it is most injurious and worst borne, are putrid fevers and diseases of debility. And so, an observation of the tolerance is sometimes a very important aid to diagnosis. Supposing a woman to complain of violent pain in the head or abdomen, which is suspected to be inflammatory: if faintness occurs from the loss of a very small quantity of blood, it will be certain either that it is not inflammatory, but nervous;—or that, if inflammatory, it must be treated by other measures than bloodletting. But the junior practitioner must bear in mind that he may occasionally meet with some thin, bloodless patients, whom it would be very injurious to bleed, but who, nevertheless, from some peculiarity of constitution, do not faint, even though bled to excess.

Reaction.—After the depressing effects of bleeding there naturally ensues a degree of reaction; the pulse rising in frequency, and the local pain returning; and this reaction will be the greater if the venesection has been carried to the extent of producing full syncope;—hence the importance of stopping short of this point.

Indications for Bleeding.—But as venesection is not to be resorted to indiscriminately in every case of acute inflammation, a few words must be added on the principles that regulate its employment. And there are three things to be considered; viz. 1st, the patient's strength, and state of constitution; 2ndly, the part affected; 3rdly, the nature and amount of the injury or exciting cause which has produced the disease.

(1.) With regard to the state of the constitution: bleeding is only to be resorted to when there is clear evidence that there is a superabundance of blood in the veins; and that the removal of a certain quantity will *immediately* mitigate the symptoms, and will leave sufficient to carry the patient through the exhausting processes of his disease. It is best borne when the blood-making powers are vigorous and the circulation strong, as indicated by redness of the face and lips, and by a full, hard, and frequent pulse. It will be of doubtful propriety if the muscles are large and flabby, and the pulse soft. And it will be decidedly wrong if the complexion is sickly and pale, the pulse quick, small, and feeble,—the lips, conjunctiva, and tongue pale. And if there should happen to be a state of atrophy of the heart, syncope would most likely be instantly fatal; and if there should be any organic disease which impedes the formation of blood, its loss is liable to be followed by irrecoverable sinking and exhaustion. *Fat people* generally bear bleeding worse, and in fact contain less blood, in proportion to their bulk, than those of a spare, lean habit and rigid fibre.

The propriety of a *second bleeding* must in a great measure be determined by the effect which the first has had on the pulse; for if that be more frequent and quick, or more sharp and jerking, instead of slower and softer, it would seem that the bleeding had diminished the strength more than it had reduced the disease. The state of the blood must also be regarded; for if the surface of the cruor be flat, and its consistence loose, it is a sign that the vital powers are depressed; that further bleeding will be injurious; and that the case must be committed to the other antiphlogistic powers.

(2.) Respecting the *part affected*, it may be observed, that the necessity for venesection, and its beneficial effects, will be greater in proportion as the *tolerance* is greater,—and that it may be indispensible if the organ affected is important to life, or to its enjoyment; whilst it may not be so if an equal degree of inflammation affected an unimportant part,—and that its good influence in inflammation of a vital organ will often be marked by a rise in the strength and fulness of the pulse.

(3.) With regard to the *nature of the cause*: bleeding is not well borne when that is such as to produce great depression of the vital powers, as in the case of erysipelatous diseases; nor in the case of an injury requiring great constitutional efforts for its reparation, as a compound fracture; nor if the disease be advanced towards suppuration or gangrene; and very seldom indeed in the case of any inflammation having a natural tendency to recovery.

II. PURGATIVES.—In all cases of acute inflammation, except those in which the action of the medicine would disturb the diseased or injured part (as in wounds of the alimentary canal) the abdominal veins should be drained and the blood purified by efficient purgatives, such as gr. v—x of calomel at bed-time, followed by F. 33, 34, or 35, &c. in the early morning, and repeated night after night till tarry, dark,

* See Art. Cupping by the Author, in the Cyclopædia of Practical Surgery.

in very debilitated habits, such as peritoneal inflammations from perforation of the intestine after fever; or acute inflammation occurring after profuse hæmorrhage.

The warm bath acts in every way analogously to opium, and requires the same precautions; viz., as it stimulates before it soothes, it must be preceded by evacuations, if required. The proper temperature is 97 Fahrenheit, and it should be continued long enough to induce a complete relaxation.

VI. SEDATIVES.—Hyoscyamus and conium are of eminent service, when combined with calomel and antimony (*F.* 62), to prevent reaction, and soothe pain in inflammatory cases attended with great nervous irritability.

VII. DIET.—The diet in acute inflammation should, as a general rule, be of the least stimulating nature. But the starving system must not be indiscriminately applied to children, or the old or debilitated; or, in fact, to any patient whatever: on the contrary, the strength should be supported, and the waste of illness is best repaired throughout by mild fluid nutriment, milk, arrowroot, veal and chicken broth, &c. In most cases there comes a time when the pulse gets soft and fast; and the cheeks, or hands, or feet chilly; and when warm wine and water is of great service; or even is absolutely essential to keep up the heart's action.

VIII. REGIMEN.—There must be a total avoidance of everything that would irritate mind or body. Perfect rest in the recumbent posture, and in a position as easy as it can be made,—cool air, a quiet and darkened chamber,—with mental consolation, to allay doubts and fears, and inspire resignation and cheerfulness, are most potent aids to medical treatment, which without them would often be utterly fruitless.*

LOCAL TREATMENT.—In the local treatment of inflammation, the first thing to be done is to remove all exciting causes if possible, and to place the part at perfect rest, and in an elevated posture;—and then the indications are, to diminish the morbid heat and influx of blood, and to allay irritation and pain.

1. The *local means of abstracting blood* are leeches, cupping, and scarifications. In order to apply leeches, the part should first be washed, and if they will not stick, a little milk or blood should be smeared on it, or some small punctures should be made with the point of a lancet; and the leeches should be well dried in a cloth. The best plan of stopping hæmorrhage from leech-bites is to dip small pellets of lint in the tinct. ferri sesquichloridi, and press them on the holes for a few minutes. Other plans are to insert a finely pointed pencil of lunar caustic into them, to touch them with a red-hot knitting-needle, or to

* A most instructive commentary on the value of antiphlogistic remedies of various kinds is to be found in Dr. Latham's second series of Lectures on subjects connected with clinical medicine, and in Dr. Watson's Lectures, vol. i. Mr. Headland's Essay on the Action of *Medicines also deserves* perusal.

lief from the cautious use of colchicum, F. 69, &c., and in which the urine is unusually clear and of low specific gravity, symptoms often disappear miraculously on the appearance of a gout in the urine. But in treating the gouty diathesis, great care must be paid to the blood-making powers of the patient, and we must not fall into the vulgar error that starvation and low diet are the best preventives.* On the contrary, whilst the kidneys are being solicited to execute their functions, by colchicum, alkalis, potassium, iodide of potassium, &c., F. 68, 69, 55, &c., it is often necessary to support the strength and tone the digestive organs by bitters, and especially by the mineral tonics, 9, 11, 13, 15, &c.

Of chronic inflammations of *rheumatic* origin, the general treatment is the same as of the gouty.

Of the alteratives that are most useful in dispelling chronic inflammation, we have already mentioned mercury and antimony; next in importance is the iodide of potassium, F. 94, 95, in combination with tonics, sedatives, alkalis, or steel, as circumstances may require. Probably it has the power of dissolving various morbid products, and of eliminating them through the kidneys. Alkalis are of service in full-blooded people, with scanty red urine: the best time we can give them is, that they will most likely be used, at the table, about an hour after meals. The caustic alkali, as the liq. potassæ, F. 87, on an empty stomach, so that it may pass unneutralized into the blood, has been shown by Dr. Parkes to have the power of causing albuminous substances to be oxidized, as shown by the increase of lactic acid, and of peculiar extractive matter in the urine.† Of the use of sarsaparilla we shall speak when treating of syphilis. Guaiacum and senega are of great service in chronic inflammations of mucous membranes. Small doses of corrosive sublimate in the tincture of F. 87, and the liquor arsenicalis, F. 97, are also useful in cutaneous inflammations, especially of the skin. In many of these cases the evil seems to be a want of vigour, through which the tissues of the skin seem unable to maintain their vitality. It is on this principle that mineral tonics, as arsenic, zinc, and copper, and the mineral acids, seem to do good, by giving a better quality to the materials assimilated.

ACTIVE TREATMENT.—This has for its objects, to relieve excitement, to unload the distended vessels, and make them contract to their natural calibre, and to exercise the part in its proper functions, so that it may gradually resume the actions and sensations of health.

1. *Local bleeding* must be employed at intervals to unload the vessels, but they must be excited to contract by various stimulants and astringents; such as the sulphates of zinc, copper, and alumina, nitrate of silver, salts of mercury, &c. The application of cold by pumping is

* Vide Todd, on Gout and Rheumatism, Lond. 1845.
† *Brit. and For. Med. Chir. Rev., Jan* 1853.

over, been proved that various kinds of secondary symptoms may arise from one kind of primary sore. At present the non-indurated chancre, common variety; the Hunterian was met with, by Dr. Egan, in two out of three hundred cases.

SECTION IV.—AFFECTIONS THAT MAY BE MISTAKEN FOR CHANCRE.

The ordinary means of distinguishing a syphilitic ulcer are, that it is seated on the genitals; that it has followed a suspicious connexion; that it is probably circular; perhaps that it has a hardened base and elevated edges; and above all, that, if treated with simple applications merely, it is extremely difficult to heal. But none of these characteristics are infallible. The surest test is that of *inoculation*, as proposed by Ricord. If some of the pus of a real chancre, taken *whilst it is extending and before it begins to heal*, be inoculated into the skin of the thigh, it will most likely produce a sore of its own kind there, after the manner we have described when speaking of the Hunterian chancre. It may be right to adopt this practice in some few cases when the existence of chancre in the urethra is suspected; or when the character of a sore on the penis are undecided; or when there is a sore suspected to be syphilitic on the face, or any other unusual part; or when it is wished to test the pus from a bubo; but the sore produced by inoculation must be destroyed by lunar caustic, or by nitric acid, as soon as its character is decided, else it may give both surgeon and patient a great deal of trouble. Moreover, it must be recollected that although the production of a chancre by inoculation proves that the sore from which the matter was taken was a chancre, yet, that the contrary is by no means proved by the failure of inoculation. For a sore, though chancrous in its origin, will not yield an inoculable matter when it has arrived at its healing stage; and it is often very difficult to procure a sore by inoculation from the common non-indurated chancre.

AFFECTIONS THAT MAY BE MISTAKEN FOR CHANCRE.—This is the most convenient place for describing the nature and treatment of various affections that may be mistaken for chancre.

1. *Gonorrhœa externa*, or *balanitis*, is an inflammation of the surface of the glans and inside of the prepuce, with profuse purulent discharge, and excoriation of the cuticle. It generally affects dirty people with long prepuce, and is caused either by the acrid secretions of the part, or by contact with unhealthy secretions in the female. Sometimes, however, it occurs to cleanly people whose health is disordered. The thick profuse discharge, the peculiar smell, the superficiality of the excoriations, and their appearance immediately after connexion, distinguish this complaint from chancre; and a little opening medicine, common soap and water, and any mild astringent lotion will suffice to cure it. Lime-water is the best lotion if there is much inflammation. [redacted] a grain of corrosive sublimate to an ounce and a half of lime-water [redacted]ere is not. If the cure is not effected in two or three days, the

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…ces should be touched with nitrate of silver. …
…s attended with very great inflammation and …
…from the great swelling of the prepuce; and the …
…ere and gnawing, as to make the surgeon …
…not a phagedænic ulcer concealed by the …
…, and the pain being general and not confined to …
…ent means of diagnosis; and repeated injection of …
…ent lotions under the foreskin are the remedies.

3. *Minute aphthous-looking points*, sometimes …
…ering the glans; some of them healing, whilst …
…y are totally devoid of pain; and although they …
…do not lead to ulcers. They are best treated by …
…lime-water, or lotions of *arg. nit.* or *sup.* …
…aperients.

4. *Herpes præputialis** begins with extreme …
a. The patient examining the part, finds …
…on the size of a split pea. On each patch …
…*vesicles*, which, being extremely transparent, …
…vesicular as the patch on which they are situated. …
…thirty hours the vesicles become larger, milky, and …
…third day they are confluent and almost pustular. …
…ated on the inner surface of the prepuce, the …
…es on the fourth or fifth day, and form a slight …
…e and rather elevated edges. If this ulcer be irritated …
…erwise, its base may become as hard as that of a …
…itself, it mostly heals in a fortnight; sooner, …
…ernal skin. The *cause* of this complaint is …
…ent of the digestive organs, or irritation within, …
…should be ascertained by the bougie. It is very …
…me individual, which, of course, if known, will …
…agnosis.

Treatment.—A little dry lint, or goldbeater's …, …
…subsequently a very weak lotion, with aperient and …

4. *Psoriasis præputii*, painful, irritable, and …
…fissures around the edge of the prepuce; best …
…nitr. dil., and arsenic internally.

SECTION V.—TREATMENT OF PRIMARY SYPHILIS.

The indications in the treatment of primary syphilis …, 1st, to destroy the poisonous ulcer, and heal the breach of … as soon as possible. 2nd, to prevent the occurrence of …

Local Treatment.—It seems to be pretty well … that if a chancre lasts for a few days only there will be no … of secondary symptoms, and no need to administer mercury. It …, a patient

* Bateman on Cutaneous Diseases, 5th ed. p. 23…; Bergeron, Dict. …, p. …

FRACTURE OF THE ACROMION is known by a flattening of the shoulder, because the fractured portion is drawn down by the deltoid; and by an evident inequality felt in tracing the spine of the scapula. It may be distinguished from any dislocation, by noticing that the humerus may be freely moved in any direction, and that, on slightly raising the shoulder, the fragment is restored to its place. This is also a rare accident; and Mr. Fergusson believes that, in some of the supposed cases of ligamentous union, the detached portion was never united by ossification to the rest of the bone from birth.

Treatment.—The same bandages, &c., are to be applied as for fracture of the clavicle; but great care must be taken to raise the elbow thoroughly, so that the head of the humerus may be lifted up against the acromion, and keep it in its place. Moreover, no pad must be placed in the axilla; otherwise the broken part will be pushed outwards too much. Union is almost always ligamentous, owing to the difficulty of keeping the parts in strict apposition.

FRACTURE OF THE CORACOID PROCESS is a rare accident, *caused* by sharp blows on the front of the shoulder.

Symptoms.—The patient is unable to execute the motions performed by the biceps and coracobrachialis; that is, to bring the arm upwards and forwards; and motion and crepitus of the detached process may be felt by pressing with the finger between the pectoralis major and deltoid, whilst the patient coughs or moves his shoulder.

Treatment.—The humerus must be brought forwards and inwards, so as to relax the biceps and coracobrachialis, and must be confined to the trunk.

V. FRACTURES OF THE HUMERUS.—*Fracture of the shaft* will be known at a glance by the limb being bent, shortened, and helpless, and by the crepitus felt when it is handled.

THE UPPER EXTREMITY OF THE HUMERUS may be fractured, 1, through the anatomical neck; 2, through the line of junction of the epiphysis; 3, through the surgical neck; 4, the greater tuberosity may be broken off; 5, the head may be dislocated from the glenoid cavity, and the cervix be fractured likewise.

(1.) Fracture *through the anatomical neck*, that is to say, within the capsular ligament, is a rare accident, difficult of diagnosis; there being scarcely any displacement: "The impairment of the motions of the joint and crepitus," says Dr. Smith, "are almost the only symptoms on which we can depend." There is one variety of this fracture in which the detached head of the bone is driven forcibly into and impacted in the reticular tissue of the head of the shaft, between the tubercles, one or other of which is usually broken off. "In this accident," says Dr. Smith, "the arm is slightly shortened, the acromion

process projects more than natural, and the shoulder has lost, to a certain extent, its rounded form; the upper extremity of the shaft of the humerus is approximated to the acromion, and the entire of the globular head of the bone cannot be felt. In consequence of the fracture of the tuberosity, crepitus can be readily detected, when the shoulder is grasped with moderate firmness, and the arm rotated. The absence of a rounded tumour in the axilla, and the impossibility of feeling the glenoid cavity, are sufficient to enable us to distinguish this fracture from luxation."

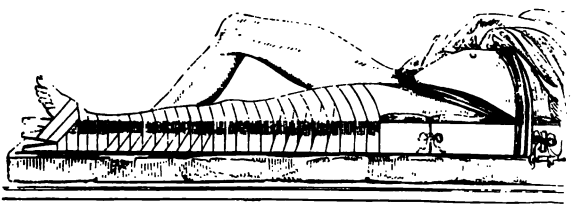
(2.) Fracture at *the line of junction of the epiphysis*, called by Sir A. Cooper, "fracture through the tubercles, or at the anatomical neck," is a not unfrequent accident in early life, and is usually caused by great and direct violence. *Symptoms.*—The head of the bone can be felt in the glenoid cavity (by which sign this accident is distinguished from dislocation); it remains motionless when the elbow is rotated; there is a striking and abrupt projection situated beneath the coracoid process, and caused by the upper extremity of the shaft of the bone, drawn inwards by the muscles which constitute the folds of the axilla. It may be felt rounded, smooth, and slightly convex, not with the sharp irregular margin of ordinary fracture: a slight extension from the elbow draws the broken point of the bone into its natural place, but it immediately projects again when the extension is discontinued: the axis of the arm is directed downwards, outwards, and backwards.

(3.) Fracture *of the surgical neck* presents nearly the symptoms of the preceding variety: the head of the bone felt in the glenoid cavity; the elbow capable of being moved by the surgeon in all directions, whilst the head of the bone remains motionless; the projection of the upper end of the shaft under the pectoralis muscle; the deformity removed by extension, but returning when the extension is discontinued.

There is one variety of this accident in which the lower fragment is driven up and impacted in the cancellous tissue of the head of the bone. This complication adds materially to the difficulty of diagnosis, inasmuch as there is some deformity, but yet none of the usual signs of luxation, or of fracture of the neck of the bone. Crepitus may, however, be produced, if the surgeon very firmly grasp the head of the bone, whilst an assistant rotates the elbow.

(4.) Fracture *of the greater tuberosity* is usually caused by blows or falls on the shoulder. *Symptoms.*—Great breadth of the injured joint; slight projection of the acromion and flattening of the deltoid, though the finger cannot be sunk into the glenoid cavity as in a

but the upper half of it can be unscrewed and removed, so as to make it a short splint, for fractures below the knee. It has a foot-board,



which can be adapted to any length of limb; which can be moved to any distance from the splint, so as to adapt the instrument to the thickness of the patient's leg; can be adapted to any degree of flexion or extension of the ankle-joint; and, what is of extreme consequence, can be turned inward or outward, so as to rotate the limb on its long axis, and prevent inversion or eversion of the foot. The advantage of this, in treating fractures and dislocations of the ankle, must be obvious.

The long splint of Mr. Winchester, composed of many pieces, like the vertebræ of an animal, and capable of being moulded to any curve, and so fixed, is very ingenious and promises well.*

2. A second plan is that of Pott.† It consists in laying the patient on the affected side, the thigh at right angles to the trunk, and the knee bent—with a many-tailed bandage and four splints, applied between the different points of bone that have just been mentioned. The disadvantages of this plan are, first, that the patient soon turns round on his back, dragging the upper fragment away from its right place; and, secondly, that the pressure on the great trochanter may cause sloughing. The first evil may be prevented simply by watching the patient and telling him to turn round on his belly rather than on his back, if he wishes to shift his position. The second may be remedied by placing him on his back, at the end of a fortnight, with his knees bent up and supported by pillows.

3. A third plan of treatment is by the *fracture-bed*, of which the best modification is that of Mr. Torry Hester, of Oxford. The patient is placed on his back; the thigh and knee bent up over a double inclined plane, in which position they are kept immoveably. But the whole bed is placed on a sort of hinge, so that the patient's trunk can be raised or lowered, without causing any motion of the hip-joint.‡

* Lancet, Aug. 20, 1853.
† Pott, Chirurgical Works, vol. i. p. 365.
‡ A New Method of managing Fractures, by James Torry Hester, 1853.

Supposing a case of very oblique fracture of the thigh, with great difficulty in preventing overlapping of the fragments; it is a good plan to cover the whole limb from the foot to the hip with soap-plaster spread on calico; then to extend it to its proper length with the pulleys, and to cover it with plaster of Paris; keeping up the extension till the plaster has become hard.*

If *both thighs* are broken, a fracture-bed should be employed: or, if the surgeon has not one, the patient should be placed on his back, with four splints to each thigh, and his knees drawn up, and supported by pillows.

(7.) *Fracture of the Condyle into the knee-joint* mostly happens to old persons, and not unfrequently proves fatal.

XII. FRACTURE OF THE PATELLA is generally transverse, and is *caused* by sudden contraction of the extensor muscles attached to it; —as, for instance, when a person who has his knee much bent under him, and is in danger of falling, tries to save himself by throwing the body forwards.

Symptoms. — Inability to straighten the knee, and separation of the fractured parts, which can be readily felt, and which is increased by bending the knee.

Treatment. — The limb must be laid straight, with a well-padded splint behind the thigh and leg, in order to keep the knee quite motionless; and the patient's body should

* A case treated in this way by Mr. Bond, of Glastonbury, will be found in Sir A. Cooper on Dislocations, p. 191.

† This cut represents an old fracture of the patella, with wide separation of the fragments. The patient fractured the bone twice. The first time he was treated with bandages, &c., to bring the broken parts together, and they united well. The second time, the limb was laid in an easy position without bandages. The result is here shown:—The upper fragment high up in front of the femur; the lower one down in front of the tibia; the power of extending the joint lost. When the knee is bent, as in the above cut, the condyles of the femur are seen with the skin tightly stretched over them.

of one or both arms, and great difficulty of breathing, especially of *expiration*, because the intercostal and abdominal muscles are palsied, and the diaphragm has no antagonist.

If the injury be *above the origin of the phrenic nerve* (fourth or fifth cervical), the diaphragm will be palsied, and death instantaneous. The most frequent example of this is the dislocation of the odontoid process, which is sometimes caused by ulceration of its transverse ligament, sometimes by blows on the back of the head, or by lifting a child up by the head.

IV. SOFTENING is a frequent consequence of concussion or laceration of the spinal cord. The affected part becomes pulpy and diffluent, without, however, any traces of inflammation.

V. ACUTE INFLAMMATION of the spinal cord is a very rare consequence of injuries, except penetrating wounds, which generally prove speedily fatal in consequence. It is known by rigours, delirium, and opisthotonos, or general convulsions, followed by palsy and coma.

Prognosis.—If a fracture is situated high up, so as to affect the respiration, the patient rarely survives more than a day or two. If it is situated in the lower part of the back, or loins, he may live two or three weeks, or a month; and, in some rare cases, recovery has even occurred, of course with permanent paraplegia. The manner in which death occurs after these injuries is from general exhaustion and debility. The appetite and digestion fail; a weakening diarrhœa comes on, and then the nates slough, and the patient soon sinks. The prognosis is very uncertain after severe blows; sometimes the patient lives and recovers the use of his limbs even after complete paraplegia; sometimes life is saved but with permanent paraplegia; sometimes, on the other hand, the patient having appeared to recover from the ill effects of the injury, most unexpectedly becomes paralytic, and dies from slow disorganization of the cord.

Treatment.—1. If there be any displacement, an attempt may be made to reduce it by extension. In partial dislocations of the neck, however, the attempt should be very cautious indeed, since, although it has succeeded (in the case of M. Guérin for instance), it has also been known to produce instant death. 2. The patient must be kept at perfect rest in the horizontal posture, and the greatest care must be taken to prevent or delay gangrene of the nates, by arranging pillows or India-rubber water-cushions. 3. The urine must be drawn off by the catheter, and the bowels be kept open by clysters and purgatives, to which Sir B. Brodie recommends ammonia to be added. Tonics and the muriatic acid may be given to support the strength, and obviate the derangement of the urine. The tympanitic state of the belly may be relieved by rubbing it with the compound camphor liniment. 4. Cupping may occasionally be employed if there are inflammatory symptoms, and the pulse is firm. But in the majority of cases, if fracture has occurred, and the cord is injured, loss of blood is contraindicated by the pulse, and would hasten a fatal issue. 5. If the

patient recover with his life, any remaining weakness or palsy may perhaps be attempted to be removed by the cautious use of blisters or issues, friction, warm bathing, and the internal use of strychnine; but they will very rarely do any good.*

CHAPTER XII.

INJURIES AND DISEASES OF THE EYE.

SECTION I.—INFLAMMATION OF THE EYE GENERALLY.

I. THE EYE is a very complex organ, containing very many different structures of great delicacy and minuteness. The effect of disease on each of these parts and structures requires to be considered separately; yet the student should be aware that he may not find in actual practice that the various diseases ending in *itis*, such as choroiditis, or sclerotitis, have such nicely-defined differences as are often assigned to them in books. No doubt there are many instances of isolated affections even amongst the most minute textures, as we shall show presently. But the first grand distinction the student must draw, is between inflammation of the conjunctiva, popularly, but falsely called *ophthalmia;* and inflammation of the eyeball. The conjunctiva, including that which covers the cornea, is a mucous membrane, subject to inflammation with mucous or purulent discharge, smarting or scalding pain, and great sensitiveness to light. This may be caused by various derangements of health; or by the application of irritants, of which gonorrhœal pus is the most intense. It may lead to opacity or degeneration of the cornea, but may be quite unattended with disease of the interior of the eye, and is greatly under the control of local astringent applications.

II. INFLAMMATION OF THE EYEBALL, on the contrary, is attended with quite a different set of symptoms;—the symptoms, in fact, which, as Dr. Jacob observes, are commonly ascribed to *iritis;* as if the iris were the only tissue concerned, whereas, in reality, in iritis, all the inner structures of the eye are more or less involved. The *symptoms* are, a bright pink arterial tint of the sclerotic; the iris altered in colour, first from increased vascularity, next from effusion; the pupil irregular, its contractile and expansive power diminished; dimness of vision; no great intolerance of light; pain, not scalding, but aching, or neuralgic, and of various degrees of intensity. Loss of transparency in the cornea, or in the membrane of the aqueous humour, adhesions of the iris, opacity of the lens and its capsule; softening of

* Vide Cooper on Dislocations, and Brodie on Injuries of the Spinal Cord, in Med. Chir. Trans. vol. xxi.

the inflamed cornea or sclerotic, so that they bulge under the pressure of the liquid within, in the form of *staphyloma;* softening of the hyaloid membrane, so that the vitreous humour loses its consistence, and becomes quite fluid; complete paralysis, or permanent dilatation of the iris; loss of healthy structure of the retina, with amaurosis, are the consequences of protracted subacute or chronic inflammation. Of the acute inflammation, attended with tensive agonizing pain, swelling of the eyelids, chemosis, flashes of light, and hot scalding tears, the consequence may be not merely effusion of lymph, with loss of transparency of the cornea and lens, and adhesion or staphyloma, but suppuration within the eye; indicated by shiverings, most acute pain, and a yellow distended cornea; which in such a case bursts, or is slit open by the surgeon.

Causes.—Inflammation of the eyeball may be, 1, *traumatic*, or caused by injuries; 2, *idiopathic*, or caused by various morbid states of the blood.

1. The first, or traumatic form, may be caused by various injuries, especially blows and wounds; but the liability to it, and the severity of it will be greatly increased by intemperance, or any other circumstance which deranges the general health. The *symptoms* will be those which we have already enumerated, in various degrees of severity, attended with furred tongue, quick pulse, headache, and fever. The *treatment* embraces all the points treated of in the Chapter on the Treatment of Inflammation in general. First, the causes—foreign bodies, chemical irritants, and the like—must be removed if possible. Secondly, soothing measures must be adopted to allay disturbed sensation;—perfect rest of the eye; opium, to allay pain and to insure repose of body and mind; application to the injured part either of a bit of soft, dry, old cambric, or of a fold of rag dipped in cold water and frequently renewed; or of linen dipped in warm water, or in a warm decoction of poppies, whichever the patient finds most soothing. Thirdly, eliminatives; such as a good dose of calomel and colocynth with rhubarb and carbonate of potass, so as to drain the blood of cacoplastic matters. These complete the preventive measures. But if, notwithstanding, inflammation does come on, then, fourthly, the afflux of blood must be checked. If the patient, according to the signs detailed at pp. 29—31, is able to bear it, a full venæsection may be performed. If not, from eight to twelve leeches may be applied to the temple. The fourth indication will also be assisted by the use of saline purges, and saline draughts with small doses of tartar emetic. Fifthly, should the preceding measures not check the disease, or should bloodletting be considered inapplicable, mercury should be given gently, as directed for iritis, so as to control the effusion, or cause it to be absorbed. Lastly, the diet should be proportioned to the patient's strength, but not too low. The eyes should be protected from light; yet without sacrificing good ventilation and coolness. As the disease is disappearing, bark will often be of material service.

2. Of the various idiopathic inflammations of the eyeball, we will

mention (*a*) that most *foudroyant* attack, which sometimes occurs in *pyohæmia*; in which the eye is filled with unhealthy lymph, and destroyed with a rapidity that admits of scarcely any remedy. See *Pyohæmia*. (*b*) Inflammation of the eyeball as a consequence of contamination of the blood from the poison of *syphilis*, is described under the head of *syphilitic iritis*; (*c*) that caused by rheumatism, common or *gonorrhœal*, is described under the head of *sclerotitis*; (*d*) *gouty* inflammation is described as *gouty iritis*. (*e*) *Scrofulous* affections are spoken of under the head of scrofulous iritis, and corneitis; and in the diagnosis of cancer, Sect. 18. Strumous ophthalmia, commonly so called, is a disease of the conjunctiva, so far as it is a local disease at all. Lastly, one eye may be affected sympathetically by disease of its fellow; a thing to be averted chiefly by extreme attention to the general health.*

SECTION II.—INJURIES.

I. **Wounds** of the eyelids or eyebrows should be most carefully adjusted by means of sutures, introduced with a very fine needle, which should pass through the cartilage, if divided. The glovers' needle is the best. The greatest care should be taken to prevent irregular cicatrization, with the distortion, entropion or ectropion, that may be the result of it. A linen rag wetted with cold water should then be laid on the part,—inflammation should be counteracted, and the patient be kept at rest till the wounds are healed. Wounds of the forehead, but more especially of the eyebrow, and of the margin of the orbit, even though the globe of the eye has not been struck, are occasionally followed by amaurosis, owing, doubtless, to concussion of the retina. The same result is sometimes supposed to follow injuries involving the frontal nerve.

II. **Blows** on the eye are generally followed by a deep-set table-looking ecchymosis, which is inconvenient enough. But sometimes a blow on the naked eyeball, even when so slight as to leave no trace of injury, or a severe blow on the temple, causes concussion of the retina, or some other deep-seated injury to the eye, dimness or total loss of sight; which, when neglected, may lead to permanent blindness.

For the prevention and treatment of ill-consequences, refer to the Section on Inflammation of the Eyeball generally.

Blood effused into the chambers is generally absorbed in the course of a fortnight, if inflammation be kept down. If coagulated firmly, it will take much longer, even months.

Rupture of the eye may be caused by a violent blow, or explosion. Whether the contents of the globe are lost, entirely or partially, extreme quietude and care should be taken to save any remnant of sight, and to avert dangerous inflammation.

* The author most strongly recommends the perusal of Travers on Inflammations of the Eyeball, by Arthur Jacob, M.D., [illegible], a book which contains, in very small compass, the best practical account of these diseases.

the opacity does not appear to have much depth. Other varieties of opacity, very chronic in their course, and evidently not inflammatory, are liable to form, as I believe, in the same tissue. They may be of a brown tint, with an indefinite margin, and may affect both corneæ at the same time."

Mr. Bowman relates two cases, one treated by himself, the other by Mr. Dixon, in which superficial opacity, caused by a thin film of earthy matter, was successfully removed by operation.*

If the *acetate of lead* is used as a collyrium when there is any abrasion of the conjunctiva or cornea, a white precipitate is formed, which is liable to become fixed in the cicatrix as a dense white spot. The film may, however, sometimes be removed by a needle. The *nitrate of silver*, if applied too long, is apt to turn the conjunctiva of a deep olive hue.

V. ONYX signifies a suppuration between the layers of the cornea, and is an occasional result of acute ophthalmia, especially of the catarrho-rheumatic. It derives its name from its resemblance in shape to the white spot at the root of the finger-nail. It mostly disappears with proper antiphlogistic treatment. If it extend very fast it may be necessary to puncture the external layers of the cornea to relieve the great pain, but the sight will be lost.

VI. ULCERS of the cornea may be results of the *phlyctenulæ* of scrofulous ophthalmia, or they may arise from mechanical injury, or from any form of conjunctival inflammation. They may likewise commence as mere abrasions, or as little nebulous spots, independently of any other affection. When a consequence of the scrofulous phlyctenulæ, they are generally deep, and tend to perforate the cornea, and leave an opaque cicatrix; when arising from other causes, they are often superficial, and heal with a semitransparent cicatrix, which gradually becomes clear.

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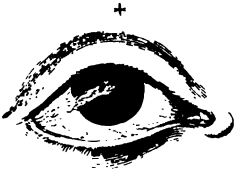


"These ulcers may," as Mr. Tyrrell observes, "exist in three states." "*First*, that which we may term healthy, when the surface and circumference exhibit a degree of haziness or opacity of a whitish or grey aspect, which is owing to the effusion of adhesive matter on the surface, and in the surrounding texture, which is essential to the healing of the part." In this state the case merely requires to be watched, to prevent injurious increase of action.

"*Secondly*, an ulcer may be inflamed, when its hazy circumference will be observed to be highly vascular. Leeches and counter-irritation

* Op. cit. pp. 37, 117.

† This figure exhibits the healing stage of an ulcer of the cornea. It is copied by Mr. W. Bagg from a drawing for which the author has to thank Mr. Partridge.

with soothing applications, are the remedies. But an ulcer is not necessarily inflamed, because it has red vessels going to it; these bring materials necessary for its repair, and are not morbid.

"*Thirdly*, an ulcer may be indolent, clear, and transparent, looking as if a little bit had been cut out of the cornea; without any vascularity or effusion of lymph. This state requires stimulating applications (arg. nit. gr. i. ad aq. ʒi)."

Again, ulcers may form on a surface that is already rendered opaque and nebulous by scrofulous inflammation. However, in any case, counter-irritation, and measures to improve the health, together with weak caustic lotion or vin. opii used twice a-day, are the chief remedies. The surgeon should remember the tendency of the cornea to slough from insufficient and non-azotized food, as proved by the experiments of Majendie. The pupil should be dilated with belladonna, if the ulcer is near the centre of the cornea.

When an ulcer is very irritable, keeping up constant pain and intolerance of light, in spite of soothing applications, the best plan is to touch its surface with a finely-pointed pencil of nitrate of silver, so as to produce an insensible film on the surface; this is to be repeated at intervals of three or four days.

VII. STAPHYLOMA is a term employed to signify any protrusion of the anterior surface of the eye.

1. *Staphyloma iridis* signifies a protrusion of the iris, which occurs when the cornea is perforated by ulcers or wounds. The term *myocephalon* is applied to the protrusion of a very small piece of the iris through an ulcerated opening in the cornea. For the treatment see p. 341.

2. *Staphyloma of the cornea* is said to exist when a portion or the whole of the cornea, whose texture has been disorganized by injury or disease has perished; and the cicatrix with which the iris has become covered, bulges before the pressure of the humours of the eye, and forms an opaque white prominence. If *partial*, it is usual to recommend that the nitrate of silver or butter of antimony be applied to the apex of the staphyloma, so that the inflammation excited may thicken the cornea, and enable it to resist further protrusion; the caustic to be well washed off with milk before the lids are closed. But besides sympathetically affecting the other eye, it is seldom that the use either of the nitrate of silver or butter of antimony checks the increase of staphyloma, and sooner or later the eye is collapsed from the necessarily extensive use of the knife. Therefore, when the staphyloma is still

* Represents Staphyloma cornea, from Dr. Weatmas

limited, Mr. H. Walton shaves it off, by which means the cut part frequently cicatrizes, and no further protrusion is effected. This treatment is applicable to small staphylomata, and especially those that rise suddenly, and have a small, well-defined base.

VIII. HERNIA CORNEÆ.—When the cornea is nearly or quite perforated by an ulcer, a thin transparent vesicle is apt to protrude from the aperture, consisting of a thin lamella of the cornea; or else of an imperfectly-organized cicatrix protruded by the aqueous humour. It may be snipped off if large, and the place be touched with caustic; but it is apt to be reproduced very rapidly.

IX. CONICAL CORNEA.—In this curious affection the cornea becomes exceeding convex, but remains transparent, and it often gives a peculiarly brilliant appearance to the eye. As it increases it causes almost total deprivation of vision, which, however, can be partially remedied by looking through a minute aperture in a piece of blackened wood, and sometimes by using concave glasses; sometimes by a combination of the concave glasses with the wood having the hole in it, or a perforated diaphragm set in a spectacle-frame. Tonics and counter-irritants may also be of service. Vide Artificial Pupil, p. 365.

X. ARCUS SENILIS is the name given to a circumferential opacity of the cornea, which has been shown by Mr. Canton to depend on fatty degeneration. As its name implies, it is most generally met with in the aged, and affects each eye symmetrically. When existing in one eye only, it is generally connected with some previous injury or disease which has spoiled the corneal tissue. Mr Canton has pointed out that the arcus, when met with in early life, as at fifty, forty, thirty, or earlier, is often associated with fatty degeneration of the heart.*

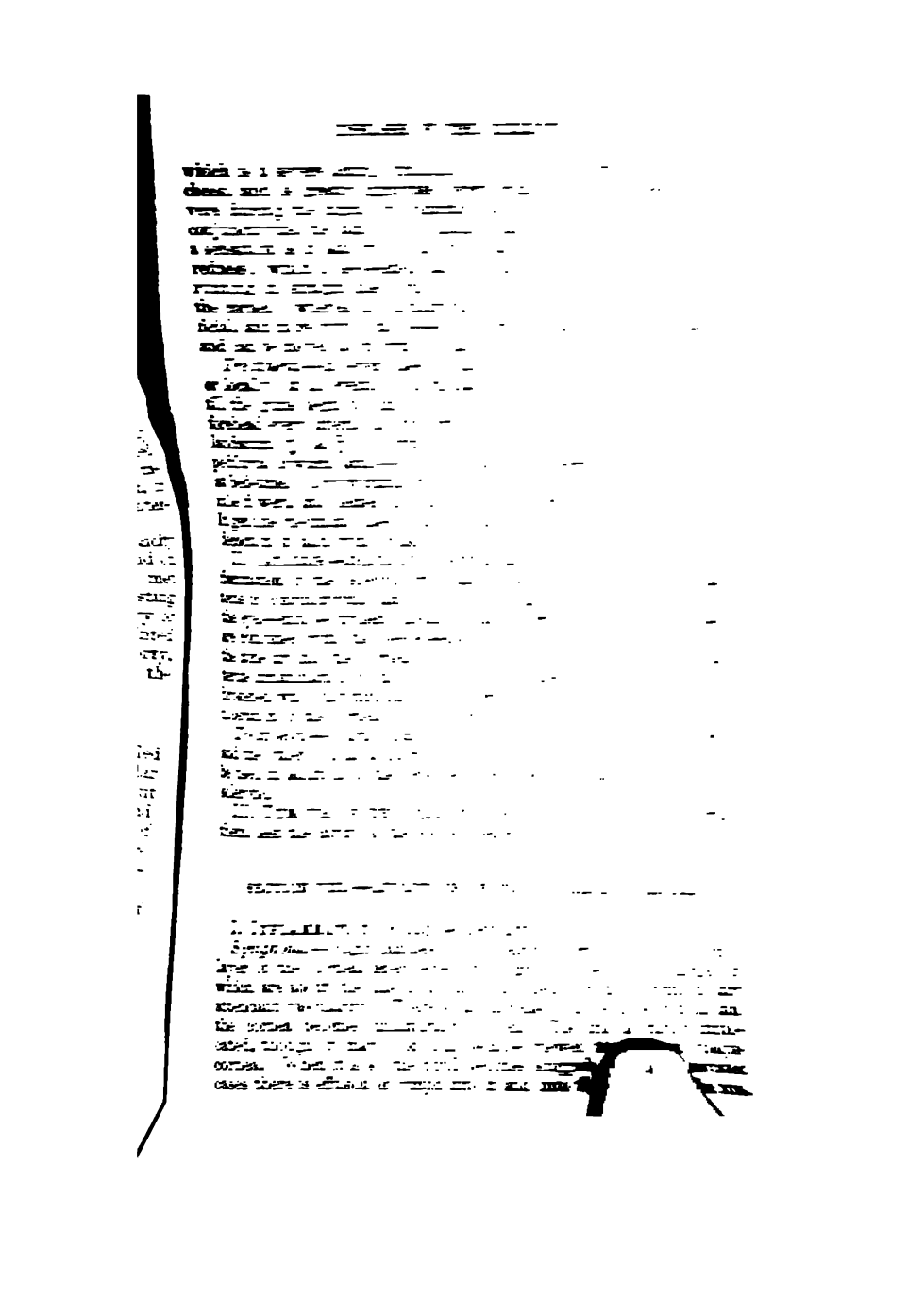
SECTION VII.—DISEASES OF THE SCLEROTIC.

I. ACUTE INFLAMMATION OF THE SCLEROTIC is commonly called RHEUMATIC OPHTHALMIA; because the structure affected is similar to that which is commonly said to be attacked by rheumatism. But sclerotitis is, properly speaking, an inflammation of the sclerotic, and in some measure also of the cornea, iris, and other proper structures of the eyeball; and it ought not to be called rheumatic, unless there are pains in the joints, acid perspiration, and other evidences of the rheumatic diathesis.

Symptoms.—It is known by redness of the sclerotic,—dimness of sight, sometimes great intolerance of light, sometimes not—severe stinging pain of the eye, and aching of the bones around, which is greatly aggravated at night,—and fever. It may be caused by cold; and sometimes is a sequel of gonorrhœa; but it is a rare disease. It may lead to opacity of the cornea, or to iritis.

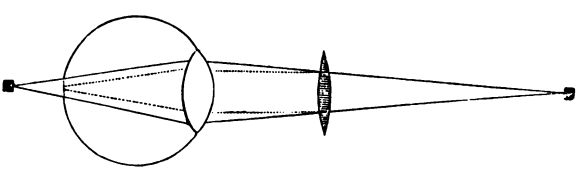
Diagnosis.—This form of ophthalmia may be distinguished from inflammation of the conjunctiva, 1st, by the character of the pain,

* Lancet, Jan. 11, 1851.



greater distance from the eyes, till the patient has acquired the faculty of reading at the ordinary focal distance—that is to say, at about fifteen inches. The glasses which are adapted for shortness of sight are concave; since they tend to disperse the rays of light, and prevent their coming to a focus so soon. They should not on any account be resorted to, however, if the patient can go on pretty comfortably without them; or at all events should only be worn when required to prevent him from stooping awkwardly whilst reading or playing music. But if the myopia is very decided, or if the eyes feel fatigued after any ordinary use of them, it will be better to wear the glasses continually. Spectacles should always be used in preference to a single glass. The patient should choose a pair that enables him to see objects within forty feet as distinctly as other people—the names on the corners of the street, for instance; but should not have them so concave as to make objects appear dazzling, or smaller than usual.

II. PRESBYOPIA, or long-sightedness, depends apparently on a diminished quantity and density of the humours of the eyeball, through which it becomes flatter, and its refractive powers are diminished. It needs scarcely be said that it is one of the earliest signs of impaired nutrition in old age. The patient's sight must be remedied by *convex glasses;* and whilst in myopia the patient should abstain from the



use of glasses if at all possible, in presbyopia, on the contrary, glasses should be used immediately that the patient perceives that he cannot read at the usual distance without fatigue to the eye; taking care that the lenses chosen are of the lowest power, that will assist vision and restore the faculty of reading at the distance of from twelve to sixteen inches. The sight should be spared by candle-light as much as possible. The glasses should cause minute objects near the eye to appear bright and distinct, but not larger than natural. If they do, they are too convex.*

SECTION XVI.—SQUINTING.

SQUINTING, or STRABISMUS, may be defined to be a want of parallelism in the position and motion of the eyeballs.

* An elderly gentleman, who had been some time presbyopic, met with a violent fall and contusion of the eyes; which doubtless produced an increased

The essential *cause* of the affection is very obscure. Probably our knowledge is best expressed by the statement that there is some weakness of sight, or some want of adjustment in the visual axis of one eye, in consequence of which it is involuntarily turned aside in order to avoid the double or distorted vision that would result from looking at objects with two eyes of different powers.

The ordinary form of squint in young persons is the *convergent*, or that in which the eye is turned inwards: the *divergent*, or that in which the eye is turned outwards, is more rare, and is chiefly met with in elderly persons, from paralysis of the internal rectus. It occasionally happens that both eyes squint; but it must be remarked that the appearance of this is more frequent than the reality. A squinting patient is in the habit of *changing eyes* as it were: that is to say, he habitually uses one eye only; and although he habitually uses the stronger eye, and squints with the weaker, yet, at times, and especially if excited, he will look straight with the squinting eye, and squint with the sound one. Hence, there is often some difficulty in deciding at first which eye is the really squinting one; a point that must be determined by quietly watching the patient, and finding out which eye squints habitually when at rest. Occasionally, it is true, however, both eyes converge at the same time. When one eye is distorted and *fixed*, the affection is called *luscitas*.

CAUSES.—1. Squinting may be congenital. 2. It may be induced by bad habits; such as the imitation of parents, nurses, or schoolfellows, if they happen to squint; or by constantly looking at spots and pimples on the nose; or it may follow affections (such as hordeolum) which render motion of the eye painful, and during which the patient turns the eye inwards and keeps it motionless. 3. It may be caused by using one eye constantly to the neglect of the other. It may be observed that many shortsighted persons have more or less tendency to squint, for the following reason:—They never use both eyes whilst they are reading or examining small objects near the eye; but sometimes use the right eye, and sometimes the left. If, however, they were by accident to persist in using one only, it would become stronger by use, and the other weaker by disuse; and the weaker might squint. In this manner squinting has been known to occur after one eye has been for a long time shaded, in consequence of an inflammatory attack; which shows the expediency of always covering both eyes when a shade is necessary. 4. If there happens to be an opacity on the cornea of one eye, and that eye is the better one, the patient will sometimes continue to use it for ordinary vision, but for that purpose is obliged to distort it so as to remove the corneal opacity from the visual axis. 5. Squinting, like almost every other conceivable consequence of defect of nervous influence, is sometimes a

secretion of aqueous humour, and restored his power of seeing at the ordinary focal distance. Presbyopia occurring in young persons generally arises from intestinal irritation, and may be a precursor of amaurosis.

three images of it may be observed. 1st. An erect image, that moves upwards when the candle is moved upwards, and that is produced by reflection from the surface of the cornea. 2ndly. Another erect image, produced by reflection from the anterior surface of the crystalline lens, which also moves upwards when the candle is moved upwards; and 3rdly. A very small inverted image, that is reflected from the posterior surface of the crystalline lens, and that moves downwards when the candle is raised upwards. To render this most distinct, the pupil should be dilated. Now, in lenticular cataract, this inverted image is from the first rendered indistinct, and soon abolished; and the deep erect one is soon afterwards abolished also. In capsular cataract, from the first, only the front erect image, that, namely, produced by reflection from the cornea, is visible.

DIAGNOSIS will be spoken of under Amaurosis and Glaucoma.

CAUSES.—Cataract, especially capsular, is sometimes attributable to inflammation, and may be caused in a short space of time by wounds or other injuries of the lens and capsule, or of the eye in general. But the ordinary cataract of the old seems to be a mere effect of impaired nutrition.

VARIETIES.—1. *Hard* cataract. This is the form that is met with in elderly people. There is an appreciable interval between the lens and iris. This form must be regarded, according to Mr. Walton, as consisting essentially in grayness or opacity, appearing in an already discoloured and somewhat dense lens; and the greater the coloration the less will be the amount of grayness required to obstruct vision.

It is common to say that, in this form of cataract, the lens is shrunken, hard, and amber-coloured. First, as to the shrinking. The fact is, that in the aged, especially when there coexists opacity of the capsule, the outer portion of the lens is often absorbed, and leaves the central or harder part. Again, when cataracts are preserved, little more than the central portion is seen, for the soft exterior separates, making turbid the liquid in which they are pickled. Moreover, in extraction, when the lens is escaping through the cornea, the soft part is not unfrequently left behind, and the nucleus only gets out. Next, as to the hardness; the cataract of an old person is not harder than the lens of that person would have been in a transparent state. Hence, we never see hard cataract before that time of life when the lens begins to be more dense. Lastly. The amber colour of cataract in the aged is caused by opacity affecting an amber coloured lens. After thirty, the lens begins to be coloured, and gets a deeper hue, till it is like a piece of amber. The opacity may commence in the centre, in the form of cloudiness, or in radii or streaks; or the circumference may be first affected, in which case, for the most part, the opacity begins in radii, which are produced by the loss of transparency of the lenticular fibres.

2. *Soft Cataract*, says Mr. Walton, exists in two states: "In the one, it is produced by opacity invading a lens that has not become amber-coloured, or in which the coloration is still slight, constituting the cataract of early years. In the other, it is associated with degene-

ration of the lens, being apparently due to changes arising out of, and inseparable from, disintegration of the lenticular tissue. It is not restricted to any period of life. A light-gray colour is the appearance presented by the first; and in proportion as the cataract occurs earlier in life, the gray is more apparent. Sometimes there is a bluish-whiteness, resembling milk and water; there may be cloudiness, and the surface may resemble a piece of fractured spermaceti; the colour is generally more intense in the centre, as in the hard variety, from the greater aggregation of opaque particles. Radii and streaks exist in soft cataract, even more frequently than in the hard, and are brighter, sometimes even glistening." *Congenital cataract* must, therefore, always be soft. In this variety vision is generally more imperfect than in the hard kind. The iris is often pressed on by soft cataract; but as this, according to Mr. Walton, may be due to an increase of the vitreous humour, or to unnatural vascularity of the ciliary apparatus, it must be held as doubtful whether the old opinion of the cause, namely, enlargement of the cataract, be correct, especially as soft cataract is so often the result of inflammatory affections of the eye.

3. *Capsular Cataract.*—In this variety the opacity may be general, or may commence partially. It is almost invariably of a dead or chalky whiteness, scarcely ever shining, and always showing the same opacity in whatever position it may be viewed. It is not unfrequently the result of a slow inflammation, which may be accompanied with pain in the eye, and signs of congestion in the head; it may be produced also by inflammation extending from the iris or conjunctiva. Opacity of the *anterior* portion may be seen immediately behind the iris. That of the *posterior* appears at some little distance behind the pupil, and presents a concave striated surface, of a dull-yellowish appearance.

4. *Capsulo-lenticular* cataract is very common,—in fact, entire opacity of the capsule is always followed by opacity of the lens.

Treatment.—The cataract must be removed by operation. No other treatment is of any avail to get rid of the disease. It is, however, a general rule not to operate till the cataract is *mature*—that is, not whilst the degree of vision is sufficient for ordinary purposes; more particularly if the patient is very old and feeble, or if one eye is already lost; because, under these circumstances, a failure of the operation would entail utter blindness. Therefore the patient should assist his vision by dropping into the eye one or two drops of a carefully-filtered solution of extract of belladonna (℈i. ad ℥i.) in distilled water, night and morning, or F. 198, so as to dilate the pupil, and defer the operation till, despite of that aid, his blindness is complete.

Prognosis.—This will be favourable if the patient is in good health and of temperate habits; if the iris moves freely, and if the retina seems perfectly sensible to light. On the other hand, it will be doubtful if there are signs of vascular disturbance in the eye; if the iris is motionless or altered in colour; or if the cataract is complicated with amaurosis, *softness of the* eyeball, or glaucoma.

Preparation.—Before operating, the patient should be put into as perfect a state of health as possible. The state of the biliary, and more especially of the urinary excretion, should be examined, and purging, exercise, and low diet be enjoined, if the habit is inflammatory. But no rude lowering measures, or violent purgation, or sudden change of diet should be resorted to indiscriminately; and some patients require a better diet, with wine. Moreover, the operation should always be performed in mild weather.

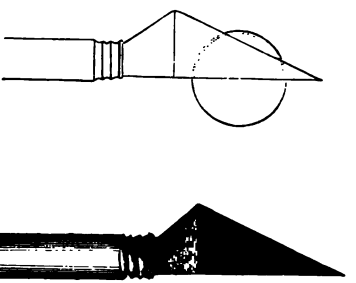
There are three methods of operating:—1, *extraction;* 2, *displacement* (or *couching*); and 3, *solution*, or the operation for causing absorption.

I EXTRACTION.—The object of this operation is, to make an incision through half of the circumference of the cornea, almost close to the sclerotic; to lacerate the capsule of the lens; and then to extract the cataract entire, through the pupil. Its advantage is, that it effectually removes the cataract; but it is the most difficult of all the operations for cataract, and demands, for its success, much knowledge and much practice. It is best adapted for hard cataracts in elderly people. But it should not be attempted, 1st, if the patient is very feeble, in case the wound of the cornea might not unite. 2ndly. If the anterior chamber is very small and the cornea very flat, so that a sufficiently large opening cannot be made in it. 3rdly. If the iris adheres to the cornea, or if the cataract pushes it forward against the cornea, thus rendering it impossible to incise the cornea without wounding the iris, or if the pupil is habitually contracted. 4thly. If the eye is sunken, or if the fissure of the lids is preternaturally small. 5thly. If the eyes are very unsteady, or if the patient is subject to habitual cough or asthma, or is unmanageable in consequence of infancy or idiocy. Some practitioners direct that one eye only should be operated on at a time, the other being kept as a reserve, whilst others operate on both together.

Operation.—In the precise manner of performing this, there are very many varieties. Some surgeons incise the lower, others the upper, part of the cornea; some sit before, others behind the patient; some are ambidexter, others use the right hand only. But, referring those who may wish for fuller information to the various works on ophthalmology before quoted, p. 365, we shall content ourselves with describing one method of operating which is, we believe, most generally employed at the present day.

The instruments required are, 1, a *Beer's knife*, a knife having a triangular blade; the back straight and blunt; the point sharp; the edge slanting obliquely; the blade increasing in thickness, as well as in breadth, as it approaches the handle. The advantages of this shape are, that it fills up the incision which it makes, and prevents the escape of the aqueous humour; and that the flap of the cornea is made by one simple motion, that is, by pushing the knife onwards. That used by Mr. Walton measures from the point to the shoulder ·8 inch, and across the broadest part, ·4 inch.

2. A *curette;* an instrument with a curved needle at one end, and a small spoon at the other. Mr. Walton has devised a guarded curette, in which the hook is concealed till protruded by a spring. 3. A secondary knife to enlarge the incision in the cornea if required. 4. A sharp hook.



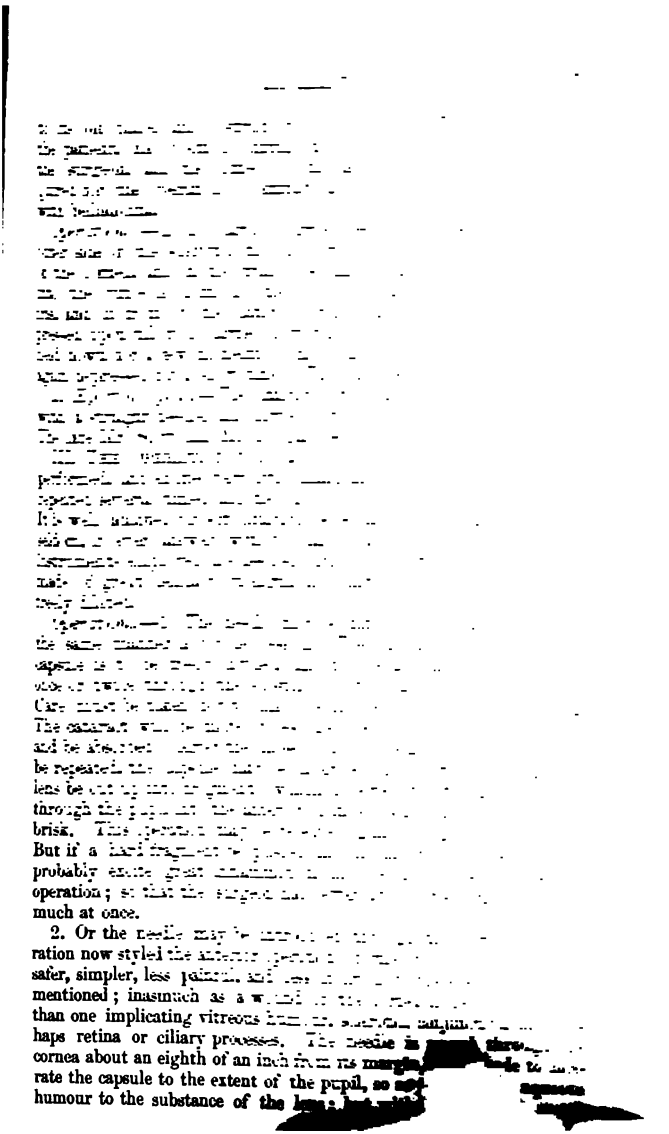
The patient may be either sitting, or lying on his back with the head properly supported, and in a good light. The operator, behind him, uses his right hand for the right, and his left for the left eye. An assistant draws down the lower lid, and steadies it against the malar bone, without pressing on the globe. The operator, with the forefinger of the non-operating hand, raises the upper lid and locks it under the edge of the orbit, just resting the point of this forefinger against the upper surface of the globe, and that of the middle finger against its inner surface, so as to steady it. Then holding the knife lightly with the thumb and first two fingers of the other hand, and resting his hand against the side of the face, he commences by—1, puncturing the cornea at the centre of its outer margin, half a line from the sclerotica. 2ndly. The blade is pushed gently across, parallel with the iris, in such a way that the point shall penetrate the other side of the cornea, exactly opposite to the first puncture; and that the edge shall cut an even semicircular flap of the upper half of the cornea. Just when the incision is completed, which should be slowly and carefully done, the eyelids should be dropped, and all pressure be ceased. 3rdly. Having waited a few seconds, the surgeon lifts the upper lid sufficiently to expose the cornea, tells the patient to look towards his feet, so that the globe may be directed downwards; then introduces the curette, and freely lacerates the capsule of the lens. 4thly. He makes *very gentle* pressure on the under part of the globe, and on the upper eyelid, till the lens rises through the pupil and escapes. Lastly, the eye should be opened after a minute or two, to see that the flap of the cornea is rightly adjusted, and that the iris is not prolapsed: if it is, the eyes should be exposed to a bright light, so as to make the pupil contract, and the prolapsed portion should be gently pressed upon with the spoon of the curette. Then the operation is finished.

Complications.— 1. Sometimes, in consequence of the premature escape of the aqueous humour, the iris falls forwards under the edge of the knife. If the point of the knife is completely entangled in the iris, it is necessary to withdraw the instrument, heal the wound, and repeat the operation afterwards. If, however, a little bit of it should get under the edge of the knife, when the section is nearly complete, the operator may push on boldly, since, if a little piece of it be cut, it will be of no great consequence. 2. If the opening of the cornea is not large enough, it must be enlarged with the secondary knife. 3. If a portion of the lens remain behind, it should be left to be absorbed—unless it has passed into the anterior chamber, and can be removed very easily indeed. 4. If the vitreous humour seem disposed to escape, the cataract should be hooked out with the hook.

After Treatment.—The patient should be put to bed, with the shoulders raised, the room darkened, and with a very soft dry linen rag over both eyes. The bowels should be kept open, and everything be avoided which is likely to provoke coughing, sneezing, or vomiting. Mr. Walton allows the usual diet, at the usual times, only in rather diminished quantity; and this plan seems preferable to that of keeping the patient exclusively on slops. If all goes on comfortably, the eyelid may be raised on the fifth day, and then if there be no prolapse of the iris, and the cornea be united, he may get up occasionally, wearing a shade, sitting in a darkened room, and walking about a little. After a fortnight the eye may be opened in a weak light, and be gradually brought into use. But, inasmuch as it remains weak and irritable, the patient must take the greatest care to avoid exposure to cold, excess in diet, over-exertion of the eye, or exposure of it to too strong a light. Gray spectacles are the best protectors against too glaring a light. The patient will require convex spectacles for exact vision, but they must be used very sparingly for some weeks. He should have two pairs, one with a short focus for near objects, and another of long focus for distant objects.

The inflammation which may come on after the operation may be of two kinds. If the eyelids are swollen, and florid, and tender, and there is a thick yellow secretion about the lids, and the conjunctiva is red, swollen, and chemosed, the inflammation is acute, and requires to be treated by bleeding and purging. But if, as Mr. Tyrrell shows, the palpebræ are not much discoloured, and are œdematous, and if the secretion is thin and light-coloured, and the conjunctiva œdematous, the patient will be benefited by good broth, carbonate of ammonia, and opium.

II. Displacement, or Couching.—The object of this operation is to remove the cataract from the axis of vision. It is a clumsy and violent operation, and adapted only to those cases of hard cataract, of which the extraction would be unadvisable, for reasons mentioned in a preceding page. The disadvantages of it are, that the pressure of the lens on the ciliary processes and retina is liable to be followed by protracted inflammation or amaurosis; and that the lens may rise again



brisk.
But if a
probably
operation;
much at once.

2. Or the
ration now styled
safer, simpler, less
mentioned; inasmuch as
than one implicating vitreous
haps retina or ciliary processes.
cornea about an eighth of an inch
rate the capsule to the extent of the pupil, so
humour to the substance of the

ting it into fragments, or, in fact, attempting to do too much. This operation is liable to be followed by severe pain and vomiting, if the cataract be so fluid that it mixes readily with the aqueous humour; or if portions of the cataract press on the iris: in the latter case, the irritation may be so severe, as to render it necessary to perform extraction. The operation may require to be repeated after two or three months.

3. There is a third modification of this operation, which Mr. Tyrrell termed *drilling*. It is particularly adapted for cases of capsular or capsulo-lenticular cataract with adhesion of the pupil, caused by iritis. It is performed by introducing a fine straight needle through the cornea near its margin, and passing it through the pupil into the lens to the depth of about one-sixteenth of an inch, and rotating it freely. This operation may be repeated at intervals of four, five, or more weeks. It causes the lens to be dissolved by the aqueous humour; and if the puncture be made in a fresh place at each operation, that portion of the capsule which is behind the pupil may become loosened and detached. This operation may also, according to Mr. Tyrrell, be occasionally resorted to, in order to diminish the size of the lens, previously to depression or extraction.

Operations on Infants.—Congenital cataracts should be operated on early—within four months, if possible, lest the eye, which, when born blind, habitually oscillates from side to side, may never acquire the power of being directed to one particular object. The pupil being well dilated, the child, narcotized by chloroform to insure quietness, should be placed on a table—the head on a pillow, and rather hanging over it—one assistant holding the legs and trunk, a second the arms and chest, a third fixing the head between his two hands, and a fourth, depressing the *lower* eyelid with one hand, and steadying the chin with the other. The operator then, seated behind the patient, performs the operation for absorption as before described; at the same time elevates the upper lid, and fixes the globe with an *elevator*. Care must be taken not to dislocate the lens. This operation on children, and, in fact, on persons under twenty, generally excites so little inflammation, that both eyes may be operated on at once, but the bowels must be kept open, and leeches should be applied if there be pain.

Capsular Cataract.—When congenital cataract of the capsulo-lenticular sort is left to itself, the lens often becomes absorbed, and the capsule, which is mostly tough or opaque, remains in the field of vision. And it sometimes happens that an opaque capsule is left, or that it becomes opaque after one of the operations for cataract. There are three plans of treatment. 1. A needle with cutting edges may be introduced, as for depression; and then may be made to tear through the opaque capsule, which then may shrink and leave the pupil clear. 2. The upper part of the capsule, for four-fifths of its circumference, may be detached by the needle from the suspensory ligament, and then be pushed down below the pupil. 3. If no other plan succeed, an

cupping, counter-irritation, and the other remedies proposed for the arthritic iritis.

SECTION XII.—DISEASES OF THE CHOROID; SYNCHYSIS AND HYDROPHTHALMIA.

I. INFLAMMATION OF THE CHOROID, or CHOROIDITIS, is not a common disease; Dr. Mackenzie has generally met with it in strumous females.

Symptoms.—It commences with more or less intolerance of light, and dimness of vision, together with pain in the eye, eyebrow, and forehead, and lachrymation. The conjunctiva is not uniformly red, but one or more enlarged vessels are seen to proceed from the back of the eye, and to terminate in a vascular zone partially surrounding the cornea. The pupil is often displaced, and brought towards the affected side of the choroid. If it proceed, the sclerotic becomes thin and blue, showing the choroid through it—a watery fluid is effused between the choroid and retina, causing the thinned part of the sclerotic to bulge out (*staphyloma sclerotic*æ), and finally the cornea may become opaque, and the whole globe very much enlarged and protruding from the socket. The digestive organs are generally much deranged from the first, and hectic and emaciation come on when the eye becomes much distended and painful.

Treatment.—If an acute case of the sort should occur in a strong constitution, local bleeding, purgatives, tartar-emetic ointment to the nape of the neck, and warm or vapour baths, and mercury, may be necessary. But in cases of debility, great caution must be used in regard to depleting measures and mercury; and together with the latter some tonic should always be given. Counter-irritation is always of service. When the sclerotic becomes much distended, it may be punctured with a needle—the instrument being introduced for one-eighth of an inch towards the centre of the eye, so as not to wound the lens; this will cause temporary relief.

II. WEAKNESS OF SIGHT; MUSCÆ VOLITANTES.—Persons of delicate constitutions and sedentary habits, especially if they are in the habit of writing much, or otherwise exerting their eyes on minute objects, are liable to suffer from dimness of sight; uneasiness on exposure to a strong light; and the vision of floating black specks or streaks, which, from their resemblance to flies, have acquired the name of *muscæ volitantes*. These symptoms evidently depend on weakness of organization, either original or produced by over exertion; and the principal measures to be adopted are tonics, aperients, shower-bathing, and change of air, with perfect rest of the eyes, which afterwards should not be used too long at a time. Weakness of sight, with intolerance of light, is very commonly an accompaniment of short sight; it may always be recognized by an uneasy bashful look about the patient's eyes, the lids of which are half closed, and perpetually winking, and the brow contracted. The muscæ volitantes are supposed to de-

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proved.

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fatigue of the eyes, shut [illegible]
of light, and [illegible]
indiscriminately by [illegible]

III. SYNCHYSIS is a [illegible]
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wards like a rag in a [illegible]
and the lens [illegible]
or concussions, and [illegible]
supposed to depend [illegible]
sometimes follows [illegible]
too freely used: [illegible]
containing tissue. [illegible]
ture, vision may [illegible]

IV. DROPSY of the [illegible]
bably depends on [illegible]
It causes enlargement of the [illegible]
there is constant [illegible]
the sclerotic with [illegible]
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thing complained [illegible]

THE RETINA must [illegible]
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ball; but sometimes [illegible]
mation. That [illegible]
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cular connexion with [illegible]
the acute, subacute, [illegible]
are—severe, deep-seated, and [illegible]
the temples and head: [illegible]
lost: frequent sensation of [illegible]
lirium. The pupil [illegible]
and the sclerotic is [illegible]
whole globe may [illegible]
ache or giddiness, [illegible]
coming motionless, and the [illegible]
increasing dimness of sight: [illegible]
irritability of the eye, and intolerance of light: [illegible]
ball, and of the parts around: [illegible]
the eye, does not always [illegible]
by the circumstance that dimness of sight and intolerance of light

occur before redness, or any external sign of inflammation. But the practitioner must carefully discern between these symptoms and the intolerance of light, or photophobia, which occurs in *Strumous Ophthalmia*, as the treatment for the two complaints should be diametrically opposite. The age of the patient, and the fact that in Strumous Ophthalmia the sufferer has periods of remission, and can usually open the eyes towards evening, will sufficiently mark the difference; besides, in acute *Retinitis*, there is deep-seated pain felt at all times, while in Strumous Ophthalmia the pain is very little felt, so long as light is completely excluded.

Causes.—Exposure to vivid light, flashes of lightning, strong fires, the reflection of the sun from snow, and the like; or habitual exertion of the eye on minute objects, together with neglect of exercise, confinement of the bowels, and over-indulgence in food and spirituous liquors, or else with debility, and want of nourishment.

Prognosis.—If, in the acute or subacute form, vision is not much impaired, nor the iris altered, nor the pupil much contracted, the prognosis may be favourable.

Treatment.—For the acute, general and local bleeding, purgatives, mercury administered so as gently to affect the mouth; for the chronic form, a gentle course of mercury, and the antiphlogistic treatment generally, according to the urgency of the symptoms, and the strength of the patient. The eyes should not be closely covered, but the patient should be kept in a darkened apartment, observing at the same time that it is thoroughly ventilated. So soon as the symptoms abate, bark and change of air will be found of great service.

SECTION XIV.—AMAUROSIS.

Definition.—Imperfection of vision, depending on some change in the retina, optic nerve, or brain.

Symptoms.—1. Of course the first and most prominent symptom is impairment of vision; the mode and degree of which are, however, subject to very great variety. Sometimes the sight becomes suddenly dim, and is soon extinguished altogether; more frequently it becomes impaired by slow degrees; and at first is so only at intervals; after the eyes have been fatigued, for instance, or when the spirits are low, or the stomach disordered. Sometimes it commences as indistinct vision, or *amblyopia*; or as *diplopia*, objects appearing double; or, as *hemiopia*, one-half only of the objects looked at being seen; or objects may appear crooked, disfigured, or discoloured; or they may be seen covered with patches; or the affection may commence as near-sightedness or far-sightedness. The patient finds himself unable to estimate distances, and misses his aim when trying to snuff a candle, or pour beer into a glass. The flame of a candle generally appears split, lengthened, or broken into an iridescent halo.

2. *Ocular spectra*, sometimes in the form of floating black spots

Prognosis.—This is generally unfavourable—unless the disease depends on some palpable cause which admits of removal, and unless the remedial measures employed very soon produce good effects.

Varieties.—Amaurosis has been divided into the *functional* and *organic:* the former depending on some sympathetic or other disorder which does not primarily affect the structure of the nervous apparatus of the eye—the latter on organic disease.

Causes.—The usual causes of amaurosis are circumstances that overstimulate and exhaust the retina; such as long-continued exertion of the eye on minute objects; or exposure to glaring light, especially if combined with heat—and these exciting causes are particularly aided by intemperance, stooping, too much sleep, and any other circumstances capable of producing determination of blood to the head. Amaurosis may also be a consequence of organic change, inflammation, concussion, compression from extravasated blood, fractured bone, morbid effusions, tumours, or aneurisms—whether affecting the brain, optic nerves, or eye.

Treatment.—The indications in every case are, 1. To rectify any palpable disorder—inflammation or plethora by depletion; debility by tonics; bad habits, if possible, by moral means. 2. To neutralize determination of blood to the eye or head by counter-irritation. 3. To stimulate and restore the excitability of the retina. For practical purposes, it will be convenient to classify the disease under the five following heads, viz., 1. Inflammatory; 2. Atonic; 3. Sympathetic cases; 4. Those produced by poisons; and 5. By organic disease.

1. *Inflammatory.*—(*a.*) If amaurosis be attended with any of the symptoms of retinitis, iritis, or choroiditis, that have been before enumerated.

(*b.*) Or if it suddenly follows some injury to the eye, such as a punctured wound, or blow on the naked eyeball, or exposure to a flash of lightning; or if the patient has been engaged in occupations that necessarily tax the eye severely, such as reading and writing much by candle-light; exposure to the intense light reflected from water or snow; staring at an eclipse of the sun, and so forth;

(*c.*) Or if there are plethora, headache, giddiness, red turgid countenance, with a hot skin and a hard pulse; and if there are frequent flashes of light, or streams of red-hot balls seen before the eyes (especially when stooping, or undergoing some active exertion);

(*d.*) Or if the complaint has followed a suppression of any accustomed evacuation, such as bleeding from piles; or the translation of erysipelas or gout; or the suppression of the menses from exposure to cold; or the sudden suppression of perspiration; or the drying up of an habitual ulcer or eruption; or if it accompanies the inflammatory hydrocephalus that sometimes follows scarlatina; in all these cases the treatment must be antiphlogistic in proportion to the patient's strength.

Bleeding or cupping from the temple or mastoid process, should be performed at intervals. The bowels should be well cleared, the diet *should* be devoid of stimulating substances, and all employment of the

affected organ, and all violent bodily exertion should be desisted from. Mercury should be administered—rapidly if the case be sudden in its attack, and present urgent inflammatory symptoms—more slowly if it present a more chronic aspect; but in either case it should be given so as to bring the system palpably, but not severely, under its influence, and its effects should be kept up for some time. Gray powder with henbane (F. 64) will suffice for most cases. Counter-irritants of all sorts are beneficial; blisters, or the tartar-emetic ointment applied behind the ears or to the nape of the neck; immersion of the feet in hot water and mustard; or an issue in the arms in chronic cases. In cases where gout is evident, colchicum; where rheumatism, iodide of potassium; where scrofula, cod-liver oil and iodide of iron may be beneficial.

2. *Atonic* amaurosis may come on at the close of some long and exhausting illness, or may be produced by great loss of blood, menorrhagia, immoderate suckling, leucorrhœa, excessive venery, or other debilitating circumstances. It may be distinguished by its being attended with general debility, pallid lips, frequent trembling pulse, dilated pupils, and despondency of mind; and the patient generally sees best after a meal or a few glasses of wine, and in a strong light. The practitioner must carefully examine into the causes of debility—whether they consist in some disorder of the system, or in depraved and unhealthy habits of life. The *treatment* consists, first, in suppressing any habitual discharge, or other source of exhaustion. Secondly, in strengthening the system by change of air, tonics, quinine, steel and zinc, and especially by good living. At the same time the abdominal secretions should be well regulated by aperients (such as aloes and rhubarb), that act copiously, but not drastically; and the cutaneous and general circulation be promoted by exercise and bathing, especially the shower-bath. Camphor or arnica, F. 190, assafœtida, and other fetid stimulants, or strychnine in very small doses (gr. $\frac{1}{12}$) may be of service. It is in this form, if in any, that local stimulants are applicable—such as exposing the eye to the vapour of æther or sal volatile (a teaspoonful of either being held in the hand); taking electric sparks from the eye; stimulating snuff (F. 184), cataplasms of capsicum to the temples; strychnine applied to the temples after the skin has been denuded by a blister, beginning with gr. $\frac{1}{8}$, and gradually increasing it to gr. $\frac{1}{2}$; one or two drops of a solution of strychnine (gr. ij. ad ℥j. aq. distill.) dropped twice daily on the conjunctiva, which plan has been found useful in some cases; friction of the forehead with cajeput or croton-oil, or with an alcoholic solution of veratria.

3. *Sympathetic.*—(*a.*) Amaurosis not unfrequently supervenes on an attack of jaundice. If there be evidence of congestion in the head, as there frequently will be, blood should be taken by cupping, whilst the abdominal disorder should be removed by appropriate measures.

(*b.*) If there be headache, vertigo, foul tongue, disagreeable eructations, tumid belly, and other evidence of abdominal congestion and disorder, emetics, repeated once or twice a-week, blue pill or hyd. c. cretâ, *in small doses every night*; and purgatives, such as senna, aloes,

relique of fevers and the exanthemata. 6. It may be induced by irritation or disorder of the stomach and bowels, teething, worms, constipation, and so forth; it may, moreover, be caused by fright or violent fits of passion; and in some children it always appears when the health is out of order, and disappears when it is restored. Lastly, it may be caused by some disorder of the circulation in the brain. Thus, it is pretty frequently the precursor of acute hydrocephalus or convulsions in children; and when it is associated with dropping of one or both eyelids, and with unusual sleepiness, or torpor of the intellect, or faltering in the gait, some mischief within the head may fairly be anticipated.

Treatment.—If the affection be recent, that is to say, of not more than a few weeks' duration, it may perhaps be removed or mitigated by judicious medical treatment, especially by purgatives, antacids, and tonics (F. 37), and by abstinence from study, and plenty of exercise in the open fields. Various devices have been proposed for strengthening and exercising the weak eye, by shutting up the sound one, wearing goggles, placing black patches on the nose, and so forth. But if the squint is of long standing and is habitual, very little good can be done unless the internal rectus muscle is divided. It is easily performed in the following manner:—The patient, if an adult, and manageable, sits in a low chair; if an unruly child, he should be quieted by chloroform and laid on a table. The instruments required are a pair of blunt-pointed scissors, a smooth slightly-curved blunt hook, and a wire speculum or retractor. Then the upper lid of the squinting eye being held up by an assistant's finger, or by a wire speculum, and the lower lid being held down by another assistant's finger, desiring the patient to look outwards, the surgeon pinches up a fold of the conjunctiva with the forceps opposite the lower edge of the internal rectus, a little behind its insertion into the sclerotic. This is snipped with the point of the scissors; and next the subconjunctival cellular tissue is snipped through, so as to expose the glistening surface of the sclerotic. It must be remarked that this subconjunctival tissue is sometimes so thick and fleshy as to be mistaken for the muscle. The aperture thus made should be quite small, only just sufficient fairly to introduce the blunt hook, which should next be thrust upwards between the muscle and the sclerotic. Lastly, the tendinous insertion of the muscle, and the conjunctiva which covers it, are to be divided with the scissors. "In order," says Mr. Walton, "to secure effectually every portion of the tendinous expansion of the muscle, the hook should be passed a little below the level of the pupil in its ordinary state of dilatation, directed backwards to a sufficient distance, swept along the side of the globe, and its point made to project just a little above the level of the pupil." When the operation is com-

[illegible] the surgeon will [illegible]
[illegible] than before it all [illegible]
divergent squint.

After the operation the [illegible]
and any inflammatory symptoms [illegible]
but it is very rarely successful [illegible]
the patient knows more than [illegible]
and worse.

The operation may be [illegible]
get rid of the deformity of the [illegible]
answered effectually; although [illegible]
side of the eyeball is sometimes [illegible]
to look more and prettier. But the patient [illegible]
between this and the squint.

The second purpose is that of strengthening [illegible]
the patient to bring it into use. And this [illegible]
swered in some measure, so that both eyes [illegible]
remote objects, and the patient says that the [illegible]
clearer; but it is not likely to be useful [illegible]
time, if at all. Moreover, after the operation, [illegible]
some degree of double vision to be complained of [illegible]
fectly intelligible when it is considered that [illegible]
eyes of different powers and adjustments. [illegible]
soon passes off, because the patient learns [illegible]
sented by the weaker eye.

In cases in which, after division of one of [illegible]
returned to its central position, Mr. Wardrop [illegible]
in its proper place by means of sutures passed [illegible]
attachment of the divided tendon, and then [illegible]
nose or temple, and all well brought [illegible]

The external rectus may be [illegible]
divergent squint; and it is the [illegible]
of divergent, which has [illegible]
No operation should be [illegible]
of the cornea, or [illegible]
and it should always be [illegible]
its antagonist is not paralyzed.

SECTION XVII.—[illegible]

I.—PROTRUSION OF THE [illegible]. We [illegible]
tumours in the eyeball [illegible]
and of tumours [illegible]
have yet to allude to the [illegible]
and *solid* or *serous* [illegible]
not yet been sufficient [illegible]

the hard palate, loosening and dropping out of the teeth, and closure of the nostril. The parietes of the cavity sometimes become so thin

from distension, that they crackle on pressure like parchment. Sometimes (though rarely) the matter makes its way into the nostril; and sometimes the abscess points externally, or bursts into the mouth.

Treatment.—A free aperture must be made into the cavity. If either of the molar teeth be loose or carious, it should be extracted, and a trocar be pushed through the empty socket into the antrum. But if all the teeth are sound, or if they have been all extracted before, an incision should be made through the membrane of the mouth above the alveoli of the molar teeth, and the bone be pierced by a strong pair of scissors or trocar, as represented in the foregoing figure. The instruments should not be made of too highly-tempered steel, lest they break. The cavity should be frequently syringed with warm water, in order to clear away the matter, which is sometimes thick like putty. If the discharge continues profuse and fetid, search should be made with a probe for loose pieces of bone, which should be removed without delay, the aperture being enlarged if necessary.

II. DROPSY OF THE ANTRUM.—The antrum may become enormously distended, in consequence of an accumulation of its natural clear mucous secretion, if the aperture into the nostril has become obliterated. In a case which occurred in Mr. Fergusson's practice in the King's College Hospital in 1850, there was great protrusion of the cheek, and of the hard palate, and other signs of tumour, so that the patient was sent up for the purpose of having the bone extirpated; but on examination it was discovered that the antrum was greatly distended with a yellow viscid fluid containing brilliant particles of cholesterine; and an opening having been established through the anterior wall of the cavity, the patient was soon discharged cured.* In some cases the parietes are so thin as to crackle on pressure.

III. TUMOURS OF THE UPPER JAW-BONE may present themselves in very great variety. Thus, in addition to the abscess and dropsy of the antrum, there may be—

1. *Hypertrophy of the bone*, some part of which increases immensely in bulk, without forming a circumscribed tumour.

2. *Exostosis*; a circumscribed tumour of bony tissue, porous, or hard and dense as ivory.

3. *Enchondroma*; which is rare.

4. *Fibro-plastic tumours* (*Myeloid* of Paget) constituting, as he observes, the *spleen-like* tumours of the jaws; of the consistence of firm brain; greyish, and blotched with red; often very difficult to distinguish from cancer, except by microscopic examination.

5. *Fibrous tumours* (*Osteo-sarcoma*); dense and homogeneous; containing bony spicula.

6. *Encysted tumours*; which, when situated within, or in front of the bone, have doubtless been more than once mistaken for enlarged antrum. Such tumours may contain glairy matter, and not seldom teeth, and probably consist of tooth capsules, unnaturally developed.

7. *Cancer* affects the upper jaw more frequently than it does any other bone, and constituted 10·35 cases of cancer of the bones collected by Lebert.

The *symptoms* of any one of these growths—which may be developed in the gums, periosteum, alveoli of the teeth, or in the cancellous substance of the bone, or in the antrum—are manifested by tumour bulging the cheek in front; which may increase, depress the roof of the mouth, and loosen the teeth; protrude into the nostril, and beneath the base of the skull into the pharynx; lift up the floor of the orbit, and displace or compress the eye; and so, if allowed to remain, may render life odious by deformity, and at last put an end to it, by interfering with breathing, or swallowing, or by compressing the brain.

The chief *diagnosis* necessary, lies between those growths of local character, which, if thoroughly extirpated, do not return, and cancer. Slowness of growth; freedom from pain; an equable and firm consistence

* Med. Times, 18th May, 1850.

tooth, and between it and its neighbours, if tumid, or tender, be deeply scarified with a fine lancet; then let the cavity be filled loosely with a little bit of cotton dipped into the solution of tannin and mastic, F. 183; and if the toothache is curable at all, this plan, with a little patience, will be almost sure to succeed. If the pain is very violent, half a grain of powdered acetate of morphia may be taken up with the cotton imbued with the tannin; which should be warmed before it is put into the cavity. In some few cases, a whiff of chloroform will lull the pain. As soon as the pain is relieved, the tooth, if of use, should be stopped with gold or amalgam; if of no use, it should be extracted.

Other remedies occasionally of service are, *warm poultices* to the cheek; *sialagogues*, especially a little piece of pellitory chewed; *anodynes*, especially warm poppy decoction held in the mouth; or a full opiate at bed-time, if the bowels have been well cleared: *stimulant*, escharotic and astringent substances introduced into the cavity of the tooth, such as a drop of strong solution of nitrate of silver, or solution of alum or of tannin; respecting which last substance the author is most grateful to acknowledge the benefit he has derived from it, since it was introduced by his friend Mr. Tomes. It may be added, that most of the violent, burning, empirical nostrums, such as creosote, oil of thyme, &c., although they may be of service when introduced in small quantity by a skilful hand into the carious tooth, at the right time, yet that when employed indiscriminately, as they are by the vulgar, they can do nothing but mischief.

It may be remarked that the gum in the interstice between a decayed tooth and its neighbour, often becomes spongy, and swelled, and excessively sensitive; giving rise to a very wearing kind of toothache; and causing excruciating pain if a portion of the food happens to be pressed down upon it. This may be relieved by a deep incision through the swollen gum, and the use of tannin gargle, of pellitory chewed, and of such aperients, F. 34, 35, as tend to unload a congested mucous membrane.

VI. INFLAMMATION of the *central pulp* sometimes affects a tooth that is apparently sound. It occasions severe, heavy throbbing pain extending to the head, and considerable tenderness of the tooth and of the gum around. It may lead to suppuration of the pulp, or to abscess in the alveolus, and death of the tooth in consequence.

Treatment.—Leeches, low diet, and purgatives.

VII.—When a tooth is partially decayed, it very frequently causes *inflammation of the* PERIOSTEUM *of its socket*, which swells and so causes the tooth to feel looser and longer than natural. The gum around the neck of the tooth is generally highly vascular. This state of things often ends in a *gum-boil* or *alveolar abscess*. A leech, or a deep incision in the gum between the diseased tooth and its neighbours, and fomentations of poppy to the interior of the mouth are the remedies.

VIII. NEURALGIC toothache, whether it occurs in teeth that are

entirely sound, or partially carious, is to be distinguished by its occurring in paroxysms which come and go suddenly, in more or less regular intervals. It is very common in the earlier months of pregnancy.

Treatment.—Quinine or the carbonate of iron in large doses, together with aperients and alteratives, are the most successful remedies.

IX. *Toothache* sometimes has the characters of chronic RHEUMATISM; flying about the jaw, affecting no tooth in particular, and not relieved by extraction, so much as by blue pill and aperients, with small doses of colchicum.

The muriate of ammonia, in half-drachm doses, every four hours, dissolved in water, and the iodide of potassium, deserve a trial in these and other obstinate cases of toothache.*

X. It sometimes happens that the fang of a tooth is thickened by a deposit of bone; in which case the tooth becomes affected with severe pain that can hardly be distinguished from that of neuralgia. It sometimes occurs on teeth that are perfectly sound, but more generally on carious teeth, or stumps. The excessive pain of this affection is in general only to be relieved by extraction.

XI. NECROSIS OF TEETH.—A tooth is said to be necrosed when it has become black and unsightly, and loose in its socket. This affection may be caused by blows which have torn across the nutrient vessels, or by inflammation of the pulp (perhaps from the abuse of mercury). Extraction must be performed, if the tooth cause inflammation or other inconvenience.

XII. EXTRACTION OF TEETH.—The instruments for extracting teeth are the forceps, the elevator, and the key.

1. *The forceps* is the instrument that is now generally employed by dentists. It should be made with sharp edges, so that it may be pushed up between the tooth and the gum, and should seize the tooth by its neck, close to the alveolus. For this purpose also, the jaws of the instrument should be made to incline towards each other in such a way, that they may slip up and embrace the neck of the tooth accurately when the handles are pressed together; and they should be

* *Vide* Dr. Watson's Lectures, Lect. 39.

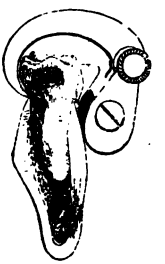
ground in such a manner that they may be adapted accurately to the shape of each tooth. For this purpose the surgeon will require several sets of instruments. Two are required for the upper molars, one for each side, because of the third fang which projects inwards. The adjoining figures show the manner in which they should fit the depressions and elevations of the tooth. One will suffice for the lower molars, both right and left, because they have only two fangs. One instrument will be necessary for the bicuspides and canines of the upper jaw, and another for those of the lower jaw; and two sets will be necessary for the incisors of either jaw.

In extracting teeth by the forceps, there are two things to be done; first, to loosen the tooth, and then to pull it straight out. In extracting the incisors and canines of the upper jaw, they may first be loosened by giving them a gentle twist, combined with a slight rocking motion, and then may be pulled perpendicularly downwards with a slight inclination backwards. The incisors and canines of the lower jaw are to be loosened by giving them a firm but gentle motion backwards and forwards, and then may be pulled straight up. The bicuspides and molars are to be loosened by moving them from side to side, so as to make the alveolar process yield a little, and then they may be pulled perpendicularly, upwards or downwards, as the case may be. The operator should grasp the forceps firmly, in such a manner that it may move altogether with his hand; but yet not so forcibly as to run the risk of crushing the tooth. The two preceding figures were sketched by Mr. W. Bagg from the hand of Mr. Tomes.

2. *The elevator* is highly useful for stumps, and for old straggling teeth. The point is to be thrust firmly down between the tooth and its socket, and then by bringing the instrument into a horizontal position, and making a fulcrum of the edge of the alveolar process, or of the adjoining tooth, or of the operator's fingers, the tooth may be lifted out.

3. *The key* is an instrument that is often employed for the extraction of the bicuspides and molars; but it is more painful than the forceps, and every one must know instances of laceration of the gum, and splintering of the alveoli, followed, perhaps, by tedious exfoliation, that have been produced by the clumsy use of this instru-

ment; not to mention the risk of the claw slipping from the decayed tooth and dragging out a sound one instead. If, however, it is preferred, care should be taken to select an instrument of proper size, and to place the fulcrum in a proper position. If the key is too small, and the fulcrum too high, very probably the crown of the tooth will be snapped off. If the key is too large, and the fulcrum too low, either the claw of the instrument may be snapped across, or the alveolar process be extensively splintered. The adjoining figure is intended to show the right position, which will draw the tooth more or less perpendicularly from its socket. The fulcrum ought to be placed on the *inner* side, for the bicuspides of the lower jaw, and molars of the upper; and on the outer side for the molars of the lower jaw. The *dentes sapientiæ* of the upper jaw should never, according to Bell, be extracted with the key, because of the delicate texture of the bone on which the fulcrum must rest.



Before extracting teeth with the key, it is usual to cut away the gum from their necks by means of a gum lancet; a practice which some authorities consider unnecessary. It certainly is unnecessary in the majority of cases, especially for the extraction of the temporary teeth, and of the teeth of old persons which have separated from the gum, and become loose in their sockets; yet it may be performed either if the gum has been subject to repeated inflammation, which renders it adherent to the tooth, and liable to be lacerated on its removal; or secondly, in order to afford room for the claw, if the tooth has decayed down to the gum. Some persons, instead of using a lancet, separate the gum by means of a small tenaculum.

XIII. HÆMORRHAGE *after Extraction of Teeth.*—This operation may be followed by very severe and dangerous hæmorrhage, which sometimes appears to come from the dental artery at the bottom of the socket; sometimes from the gums, when they have been long diseased. The cavity must first be cleared of all coagulum; then a piece of *matico* leaf, or a little strip of lint loaded with powdered matico; or a bit of nitrate of silver may be put into the socket; but if neither of these remedies succeeds, the alveolus must be plugged in the following way: It is first to be cleansed from coagulum; then one end of a long thin strip of lint is to be firmly pressed into it, so as to come into contact with its very bottom, and the remainder in successive portions is to be forced in till the socket is filled up to the level of the gum. A compress should then be placed on the part, thick enough to be pressed upon by the antagonist teeth, and the

mouth should be kept firmly closed by a bandage passing from under the chin to the vertex.

XIV. TARTAR, or *salivary calculus*, is an earthy matter deposited on the teeth from the saliva. It is found most abundantly on the superior molars and inferior incisors, obviously because those teeth are nearest the orifices of the salivary ducts. If suffered to accumulate, it causes inflammation and absorption of the gums, and gradual loosening of the teeth.

Treatment.—The deposit of this substance is to be prevented by taking care not to disorder the stomach, and by the strictest cleanliness. The teeth should be cleaned at least twice a-day, with a soft tooth-powder (camphorated chalk is the best) and a little soap. The hairs of the tooth-brush should be soft, and not too closely set; so that they may penetrate the better into the interstices of the teeth. When any quantity of the tartar has accumulated, it should be removed by the *scaling instruments*. The edge or point of the instrument is to be introduced between the concretion and the gum, so as to detach the former in flakes; in the meanwhile a finger or thumb, guarded with a towel, should be pressed firmly on the cutting edges of the teeth, so that they may not be loosened by the force necessarily employed. Sometimes a small portion of this substance is found sticking in the orifice of one of the salivary ducts, and creating great discomfort by its irritation. It may be easily removed.

XV. INFLAMMATORY SOFTENING AND ABSORPTION, vulgarly called *scurvy* of the gums, generally affects middle-aged or elderly people, and may be a consequence of the accumulation of tartar, but more frequently depends on a congested state of the liver and bowels. The gums are swollen, spongy, exceedingly tender, and subject to constant aching pain, and they bleed on the slightest touch. If the disease proceeds, they separate from the teeth; the alveoli gradually become absorbed, and the teeth loosen, and at last fall out. These consequences are sometimes speedy, and are attended with suppuration in the alveoli, but more frequently they are slow, the teeth dropping out one by one in the course of years.

Treatment.—The gums should be unloaded by deep and free scarifications and repeated leechings; the bowels should be well cleared by a course of purgatives; and gargles should be employed to correct the secretions of the mouth, and excite the vessels to contract. Whilst there is much pain and soreness, dec. papav. vel. anthemid., or three drachms of nitre dissolved in a pint of barley-water will answer best. Subsequently, recourse may be had to F. 109, 111, &c.

XVI. GUM-BOIL (*alveolar abscess, parúlis*) is a small abscess commencing in the socket of a tooth, and bursting through the gum, or sometimes through the cheek. It is usually caused by the irritation of a dead or carious tooth. In neglected cases, extensive exfoliation of the bone may follow.

Treatment.—Fomentations; removal of the tooth, if much decayed; and an incision as soon as matter can be detected. If the tooth

is extracted soon, the sac of the abscess very often comes away with it.

XVII. EPULIS signifies a tumour formed by an hypertrophy of the fibrous tissue of the gum, intermixed with abundance of fibro-plastic cells and nuclei. It generally commences between two teeth, which it gradually separates, then loosens, and finally displaces, and may spread so as to involve several of them. Or it may begin on the free surface of the gum, internal or external, and may form a tumour flat, prominent, polypous, or pendulous. This tumour is indolent, painless, and of slow growth; but it ought always to be extirpated without delay, because it is sure to increase, and might become the seat of offensive ulceration, or even of cancer.

If possible, it must be cleanly shaved from the periosteum; but if necessary, the tooth on either side must be extracted, and the tumour entirely cut out. A portion of the alveolar process must be removed likewise, if necessary in order to render the extirpation complete.

A similar tumour is sometimes formed when a dead portion of the root of a tooth remains in its socket, and the gum has healed over it. The tumour should be entirely removed with the knife, and the extraneous body should be sought for, and be extracted, if possible.

Cancerous tumours of the gums are exceedingly rare; they will, however, be recognised by their rapid growth, and tendency to hæmorrhage.

CHAPTER XV.

SURGICAL DISEASES AND INJURIES OF THE NECK.

SECTION I.—SURGICAL DISEASES OF THE FAUCES.

I. ACUTE TONSILLITIS, QUINSY, or INFLAMMATION OF THE TONSIL, is known by rapid swelling of the part, considerable throbbing pain; deglutition difficult, perhaps impossible; headache, foul tongue, and fever. It must be treated by leeches, poultices, a dose of calomel, followed by purgatives, inhalation of the steam of boiling water, gargles calculated to promote the secretion of saliva (F. 107), and the ordinary antiphlogistic routine. If the gland continue to swell, or if it occasion any embarrassment to the breathing, an incision should be made into it to unload the vessels, and give exit to matter. The tongue should be depressed with the forefinger, whilst a straight bistoury, wrapped round with lint except an inch and a half of its point, is plunged directly into the tumour, and made to cut its way out towards the median line. Abscesses behind the pharynx require similar treatment.

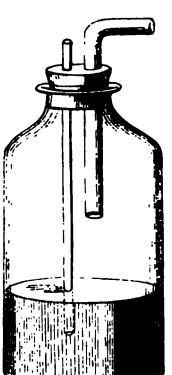
II. CHRONIC ENLARGEMENT OF THE TONSIL is a frequent sequel of inflammation, especially of reiterated catarrh in scrofulous children.

It causes sundry inconveniences. The parts are liable to frequent attacks of acute inflammation; deglutition is impeded; the voice is rendered hoarse; respiration is noisy and laborious, especially during sleep; the diseased state of mucous membrane is extremely liable to be continued into the ear, as we explained when treating of throat deafness, and to lead to disorganization of the delicate structures in the tympanal cavity; and suffocation has even been caused by viscid mucus entangled between the swollen glands.

Treatment.—In the first place the system must be strengthened, and the secretions be kept up by proper tonics and alteratives. Steel, especially the iodide, bark, cod-liver oil, or F. 87, 65, 41, 37, &c., may be administered with benefit. At the same time contraction must be promoted by astringent gargles, F. 109, by swabbing the throat once a day with lotions of arg. nit. or cupri sulph., or liq. iodinii, and by applying stimulating or iodurettted liniments to the skin.

The method of *swabbing* is simple. A piece of sponge the size of a walnut must be put over the end of a stick, cane, or whalebone, in such a way that it completely covers the end of the stick; and it must be firmly sewn or fastened on. The patient sitting, opens his mouth, and the surgeon having made the sponge to imbibe a solution of nitrate of silver, presses down the tongue with the left forefinger, introduces the sponge into the pharynx, and fairly swabs out every part of it.

Inhalation of vapour is another remedy of the greatest possible efficacy when the mucous membrane of the fauces, mouth, and tonsils is flabby and swollen; as well as in the catarrhal rhinorrhœa, in throat deafness, and in coughs attended with copious expectoration. In order to inhale effectually it is necessary to have some apparatus; and the essence of all such apparatus is, that they have one passage for introducing the external air below the surface of the liquid whose vapour is employed; another through which the patient can draw the air mixed with vapour into his mouth. The cheapest and most efficient inhaler the author is acquainted with is a simple double tube with mouth-piece, sold by G. Mawe, of Aldersgate-street. But, for the sake of the poor, he recommends one to be made thus:—Take any large stone or glass bottle with a wide mouth, and a soft cork; take two pieces of German glass tubing; bend the shorter one at an angle to serve as mouth-piece; put the ends into a gas flame, to melt off any sharp



edges; bore the cork, by means of a rat's-tail file, with two holes for the tubes to pass through; put the necessary liquid into the bottle; insert the cork with the tubes, and the machine is ready for use. The most efficient vapours are evolved from boiling water, to which twenty drops of creosote, or the same of tincture of iodine have been added. Mr. Harvey tells the author that he sometimes adds tincture of guaiacum.

If these measures fail, and such an operation is deemed necessary, part of the gland should be removed with the knife— a much more expeditious and cleanly method than the ligature. The surgeon seizes the tumour with a hook or forceps (depressing the tongue with its handle), then introduces a blunt-pointed curved bistoury, and shaves a thin slice off, cutting upwards, parallel to the isthmus faucium. The nearest half of the blade of the bistoury should be wrapped in lint, to prevent the lips from being cut; and in operating on the right side, the surgeon will find it most convenient to cross his hands, the left, holding the vulsellum, being undermost. Very little should be removed: not only to avoid hæmorrhage, but likewise because of the possible truth of Mr. Harvey's theory that removal of the tonsils interferes with the development of the genital organs. There are certain *guillotine* instruments which can also be very adroitly used for this purpose. Specimens of excised tonsils which the author has examined have been infiltrated with cells, most of them exactly resembling pus.

III. ENLARGEMENT OF THE UVULA produces tickling cough and expectoration by irritating the larynx. If it does not yield to the treatment directed for enlarged tonsil, it should be stretched and steadied with forceps, and be cut through in the middle with a pair of long scissors.

Our design being to describe such affections only of these parts as require surgical remedies, we must pass over the various other sorts of sore throat, which are assigned to the physician; merely remarking that the affection which we have described as *quinsy*, is phlegmonous and deep, yet that the superficial and catarrhal inflammations require nearly similar treatment.

SECTION II.—SURGICAL AFFECTIONS OF THE ŒSOPHAGUS.

I. SPASM OF THE ŒSOPHAGUS (*spasmodic stricture*) is known by its generally occurring in sudden fits—the patient at a meal finding himself altogether incapable of swallowing, and the attempt to do so producing spasmodic pain and a sense of choking. The *diagnosis* between this and the *organic* or *permanent stricture* is founded on the suddenness of its accession: it being much better at some times than at others; and the fact that the bougie, if passed, either meets with no obstruction, or with one that very easily yields.

Treatment.—This affection always depends on a weakened or hysterical state of the system, or on the presence of some other disorder,

as has been mentioned whilst treating of neuralgia. Brodie relates a case that ceased on the removal of bleeding piles; and Mayo another that was cured by relieving chronic disease of the liver. Tonics, antispasmodics, and alteratives, especially iron with aloes and galbanum at bed-time; exercise in the open air; the shower-bath, and other forms of warm and cold bathing; great attention to the diet; care not to swallow anything imperfectly masticated or too hot; and the occasional passage of a bougie, are the remedies.

II. PALSY OF THE ŒSOPHAGUS occasions inability of swallowing, but without pain or other symptoms of spasm; and a bougie, when passed, meets with no obstruction. It generally depends on organic disease of the brain or spinal cord, which must be examined into and cured if possible. The patient should be fed by the stomach-pump, by nutrient enemata, and by pushing soft food occasionally down the œsophagus with a probang. The palsy has sometimes been temporarily relieved by electrifying the patient on an insulating stool. Nutrient enemata should be composed of very strong beef or mutton broth, without salt or spice. The quantity injected at one time should not exceed four ounces; and if the rectum does not retain it a few drops of laudanum should be added.

III. DILATATION AND SACCULATION.—The œsophagus has been found after death exceedingly dilated. The symptoms during life were great *dysphagia*,—food, when swallowed, never seemed to reach the stomach, and was vomited in a few minutes. If this condition should be ascertained during life, the patient should be fed as in palsy. Sometimes a blind pouch is connected with the œsophagus, and occasions great distress in swallowing, by intercepting the food. It may be formed either by a protrusion of the mucous membrane through the muscular fibres, or by the sac of an abscess which has burst into the tube. The only remedy is to feed the patient constantly with the stomach-pump, so that the pouch may be allowed to close.

IV. PERMANENT STRICTURE of the œsophagus signifies a narrowing produced by a thickening of its coats, which form a firm ring, encroaching on the canal. It is generally found just below the termination of the pharynx; that is, opposite the cricoid cartilage, and is most frequent in females. The *symptoms* are, difficulty of swallowing, noticed probably for years; gradually increasing; never absent; and occasionally aggravated by fits of spasm. The act of swallowing frequently produces pain in the chest, which shoots between the shoulders, and up to the head. When a bougie is passed, it meets with an obstruction. The *causes* of this affection are generally unknown; sometimes, however, it appears to be a sequel of repeated quinsy, or to be caused by swallowing boiling or corrosive liquids; in one case it appeared to be induced by violent retching in sea-sickness. The *prognosis* is always serious, especially if the complaint is of long duration. If unrelieved, its *consequences* will be ulceration of the œsophagus, either above or below the stricture, with salivation, vomiting of purulent matter, and impossibility of deglutition, which in no

long time will be followed by death. The fatal termination may be owing either to sheer starvation, or to the irritation of the local disease, or the extension of ulceration to the lungs.

Treatment.—A mild course of mercury, so as just to affect the gums, occasional leeching, to relieve exacerbations of pain or spasm, combined with hyoscyamus or conium, if there be much irritability, a seton between the scapulæ and the occasional passage of a bougie, or of a *ball probang*—an ivory ball attached to a piece of whalebone or flexible wire—or of a piece of sponge moistened with a weak solution of nitrate of silver, and attached to a stout copper wire, as recommended by Sir C. Bell, are the remedies. The method of introducing the bougie is as follows:—The patient sits upright, with the head thrown as far back as possible, and the mouth wide open. The bougie, which should be previously warmed in the hand and oiled, and gently curved, is passed down into the pharynx in such a manner that its point may slide along the vertebræ. In order that it may not excite cough by interfering with the epiglottis, the patient should be directed to protrude the tongue from the mouth as far as possible; or to perform the act of deglutition just when the bougie is entering the pharynx. If it meets with an obstruction in its descent, the surgeon should slightly withdraw it, then again press it gently against the obstruction, increasing the pressure for a few minutes if it gives no pain. If it fail to pass, a smaller one should be tried.

V. ULCERATION.—"Simple but fatal ulceration," as Mayo correctly called it; that is to say, *phagedænic or corroding ulceration*, without the pre-existence of epithelioma or of cancer (compare p. 7[illegible]), is liable to affect the pharynx at the level of the cricoid cartilage, or the œsophagus lower down. If a bougie is passed, it meets with an obstruction just above the ulcer, and with another just below it, and

* This cut exhibits a stricture of the œsophagus. From the [illegible] Middlesex Hospital.

its point returns marked with bloody pus, and presenting the ragged impression of the ulcer. The consequences are always the same;—exhaustion from the irritation of the disease, and from the inability to swallow; or possibly a more speedy death from perforation of the aorta, or of the pleura.

VI. EPITHELIOMA and CANCER also sometimes affect this part. The symptoms are alike: burning pain between the scapulæ; and difficulty of swallowing.

Treatment.—A deposit of hard cancer into the walls of the œsophagus will at first be scarcely distinguishable from stricture, and must be treated like it; but when burning pain indicates ulceration, then nutrient enemata, belladonna plasters to the back, opium, ice-cream, &c., should be used to relieve the pain; and a very careful diet, including eggs, meat beat to a pulp, and other nutriment of small bulk.

VII. TUMOURS pressing on the œsophagus, whether abscesses, polypi, aneurisms, bronchocele, or enlargement of the bronchial lymphatic glands, will produce all the symptoms of organic stricture. Aneurisms and abscesses have been burst by the passage of bougies—with, of course, instant death in the former case, and relief in the latter. Before performing this operation, therefore, the chest ought to be well scrutinized by auscultation, to detect any unnatural pulsation or *bruit;* and any signs of embarrassed circulation or respiration should not be overlooked.*

Polypus.—Cases are recorded of polypous tumours projecting into the pharynx or œsophagus. If discovered, an ingenious surgeon might remove them somehow.

VIII. FOREIGN BODIES, when fixed in the PHARYNX, or about the aperture of the larynx, or in the œsophagus, produce a sense of choking, and fits of suffocative cough. This accident, if unrelieved, may prove fatal in two manners. The patient may either be suffocated at once, by spasm of the glottis, or, if the foreign substance remains impacted, it may produce a fatal ulceration of the parts, attended with exhausting cough and dyspnœa, and profuse fetid expectoration.

Treatment.—The patient should be seated in a chair, with the head thrown back, and the mouth wide open. The surgeon should then introduce his finger—regardless of attempts to vomit—and should pass it swiftly into the pharynx, and search the whole of it thoroughly. When the substance is felt, it may perhaps be entangled in the point of the nail, or curved forceps may be guided to it by the finger. Pins or fish-bones are often entangled about the velum, or in the folds of mucous membrane between the epiglottis and tongue.

* Vide Sir E. Home on Strictures, vols. i. and ii.; Monro on the Morbid Anatomy of the Gullet, &c.; Brodie on Local Nervous Affections (*spasmodic stricture*); Mayo's Pathology; Stokes in Cyclop. Pract. Med. vol. ii.; and Sir C. Bell's Institutes of Surgery, vol. i.; Arrowsmith's case of Polypus in Œsophagus, Med. Gaz., N.S., p. 165. There is a case of congenital imperforate œsophagus in the Musée Dupuytren, at Paris; it was continuous with the trachea.

If the body has passed into the œsophagus, and it is small and sharp (a fish-bone, for instance), it may be got rid of by making the patient swallow a good mouthful of bread. If large and soft (as a lump of meat), it may be pushed down into the stomach with the probang. But large hard bodies, especially if rough and angular (such as pieces of bone or glass, &c.), should be brought up if possible. A pair of long curved forceps, or a piece of whalebone armed with a flat blunt hook, or with a skein of thread, so as to form an infinite number of nooses, are convenient instruments. If the stomach is full, a dose of tartar emetic dissolved in a very small quantity of water may be administered, in the hope that when the contents of the stomach are vomited, they may bring up the offending substance with them. One case is on record in which a chicken-bone lodging in the œsophagus was dissolved by making the patient swallow large quantities of dilute acid. If all means fail, however, and the substance can neither be brought up nor down, and if it be lodged in the cervical portion of the tube, it must be extracted by the operation of œsophagotomy in the following manner.

IX. ŒSOPHAGOTOMY.— This operation should be performed on the side towards which the foreign substance projects. Its situation having been ascertained, an incision of sufficient length must be made through the skin and platysma between the sternomastoid muscle and trachea. The cervical fascia must next be divided on a director. The surgeon must then divide the cellular membrane with a blunt knife, or lacerate it with his fingers, avoiding the carotid and thyroid arteries and the recurrent nerve. A common silver catheter may then be passed down the throat, and be made to project in the wound, so that the œsophagus may be opened by cutting on it. This small wound in the œsophagus should be dilated with forceps, in order to avoid hæmorrhage, and the foreign body should then be extracted. This operation has occasionally been performed for the purpose of conveying food into the stomach in cases of stricture of the œsophagus, but with no very satisfactory results.*

X. USE OF THE STOMACH-PUMP.—The tube of this instrument is to be introduced in the same manner as the œsophagus bougie. It is usual to place a gag in the patient's mouth, having a hole for the tube to pass through, in order that it may not be compressed by the teeth. Before pumping out the contents of the stomach, one or two pints of water should be injected into it, and care should be taken *not to withdraw quite as much* as was injected. More water should then be thrown in, and the process should be repeated till it returns colourless.

The stomach-pump is by no means so universally efficacious as is popularly supposed. It ought only to be employed in those cases of

* Vide Arnott on Œsophagotomy, Med. Chir. Trans. vol. xx.; Report of a case in which it was performed unsuccessfully for the relief of stricture by Mr. Watson, of New York, and of two cases in which it was performed for the removal of a *foreign* body, in vols. ii. and iii. of Ranking's Abstract.

fingers or handle of the scalpel; the thyroid gland, if in the way, is pushed up; then the patient being told to swallow, the surgeon seizes the moment, and whilst the trachea is stretched, sticks in his knife, with a slight jerk,* at the bottom of the wound, and carries it upwards, so as to divide three or four of its rings. The operator must take great care to keep in the middle line, and must be very cautious not to cut downwards at the bottom of the wound, for fear of the large veins. Hæmorrhage may be arrested, if arterial, by the ligature; if venous, by nicely-adapted pressure; which must be kept up with the point of the fingers if nothing else suffices. As soon as an opening is made, the foreign body is usually expelled with a strong gust of air; but if not, it must be searched for with a probe, and be removed by forceps or by a blunt hook. If there is any difficulty, the plan may be tried, which has recently been practised with success, of turning the patient with his head downwards, in order to let the foreign substance fall through the rima glottidis; and it may be remarked, that as soon as an artificial passage is made for the patient to breathe through, the great irritability of the natural aperture subsides, so that it permits the body to pass. The wound may be closed by plaster when bleeding has ceased.

If the operation were performed for the relief of dyspnœa, a *conical* curved tube should be introduced for the patient to breathe through.

From its shape, it fits tightly into the aperture, and prevents the entrance of blood into the trachea. It should be of such a size, as Trousseau has remarked, that the air may pass through it in respiration without any whistling noise.† When the patient wishes to cough or speak he must be taught to close its orifice with his finger. It should be frequently cleared of any mucus that may lodge in it.

The operation of opening the larynx or trachea, may be required for various diseases and injuries which cause mechanical impediments to respiration; such as acute laryngitis, croup, chronic laryngitis with ulceration, œdema glottidis, tumours, and some injuries which have crushed the larynx. We have space for a very few observations only on these cases.

1. In acute *laryngitis* and in croup, when remedies fail to make any impression on the disease, tracheotomy should be performed. Some surgeons condemn this operation in croup, on the plea of its

* The trocar is, as Mr. Fergusson justly observes, a most clumsy and inefficient instrument for opening the trachea; which, being an elastic tube, yields and bends before the pressure necessary to introduce the point of it. The author once saw a surgeon fruitlessly endeavour to use it; and he seemed in great danger either of running it through both trachea and œsophagus into the vertebræ, or else of letting it slip sideways into the jugular vein.

† Trousseau de la Trachéotomie, L'Expérience, Nov. 5, 1840.

hopelessness. But, on the other hand, we reply that it is the only remedy; that it has undoubtedly in many cases prolonged a life which was on the verge of extinction by suffocation; that it furnishes an exit for flakes of false membrane that cannot pass the rima glottidis; and that it very likely would be more successful if it were done earlier, without waiting till the patient is exhausted by struggling for breath. Mr. Henry Smith has published an able paper on this subject. In the state called *œdema glottidis*, in which the submucous tissue about the glottis becomes infiltrated with serum in consequence of a low degree of inflammation, or of a general dropsical diathesis, a glance at the preceding figure will show that an artificial aperture must be often necessary to preserve life. This state may be suspected when intense dyspnœa, not referable to disease in the chest, arises during sore throat, or erysipelas; or when it occurs spontaneously in unhealthy constitutions, without any acute inflammatory symptoms.

2. In chronic inflammation and ulceration of the larynx, the operation should also be performed before the disease has lasted long enough to exhaust the patient by the spasmodic cough, dyspnœa, and purulent expectoration which attend it. This is an occasional consequence of secondary syphilis, as mentioned at p. 189, and more frequently of confirmed phthisis; but the operation should always be performed if there is imminent danger of suffocation, even though the patient's ultimate recovery may be quite hopeless. *The application of a solution of nitrate of silver* (g. xx. ad. ℥i) *within the larynx* is, on general principle, likely to be beneficial in cases of disease of a prolonged asthenic or irritative character;—obstinate cough, such as the latter stages of hooping-cough; obstinate hoarseness or loss of voice; or ulceration from any cause, with copious expectoration. The tongue must be drawn downwards and forwards with the left forefinger, or with a curved spatula; then a curved probang carefully coated with sponge, a quarter of an inch in diameter, moistened with the solution, should be passed into the glottis. It must not be allowed to touch the pharynx, or it will cause efforts at vomiting.*

3. The operation is sometimes required for tumours, warty excrescences, and epithelial growths growing within the larynx; cases

* See papers by Dr. Horace Green, and Dr. S. Watson, in Ranking, vol. xvi.; Wagstaffe, Cotton, and others, at Lond. Med. Soc.; Lancet for 1852. J. Hughes Bennett on Pulmonary Tuberculosis, Edinburgh, 1853.

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performed tracheotomy, but without avail; for the man expired very soon afterwards; and on a *post-mortem* examination it was found that there was nothing the matter with the larynx, but that a large aneurism existed on the arch of the aorta. What was the use, it was said, of cutting the throat of a man who was dying of aneurism? The house-surgeon, however, was not so much to blame, as he was then considered; because, as is now very well known, tumours about the aortic arch may produce spasm of the glottis, by interfering with the recurrent nerves. But now that this fact is known, every surgeon should carefully scrutinise the chest in obscure cases of dyspnœa, to see whether it arise from this cause. No permanent good can then result from tracheotomy; yet the author heard of a case lately, at the Winchester Hospital, in which it certainly rescued a patient from immediate death, although he died shortly afterwards from other effects of the aneurism. But the operation is not admissible in that spasm of the glottis which often affects children during teething; nor in cases in which the symptoms of laryngitis are mimicked by hysteria.*

III. POLYPUS OF THE EPIGLOTTIS, LARYNX AND TRACHEA.—It has been explained already (p. 416), that the barbarous term polypus signifies any kind of pendulous tumour. Professor Ehrman of Strasburg has collected the histories of thirty-one cases of polypus of these parts in the human subject, three in the cow, and two in the horse, in an interesting monograph. The early symptoms are hoarseness, and perhaps loss of voice, especially if the tumour be situated near the chordæ vocales; cough of a croupy, suffocative character; sense of obstruction in breathing, speaking, or swallowing; dyspnœa, gradually increasing with the growth of the tumour, next coming in terrific fits of suffocation, at last fatal: when the tumour, if within the trachea, is driven up between the chordæ vocales by expiration; or if attached to the epiglotis, is drawn down by inspiration. The most distinctive symptom is a valvular flapping sound heard or felt when the tumour moves during respiration. In more than one case the tumour, or a portion of it, has been torn off and coughed up; this of course decides the diagnosis. In a case by Mr. Stallard, the tumour was detached within the trachea, and the patient died suffocated. Polypi here, as elsewhere, are usually fibro-cellular, fibro-plastic, or epithelial. The symptoms above detailed are such as imperatively demand tracheotomy. But besides this, if the presence of a tumour is ascertained, or is highly probable, further measures may be adopted. If the tumour is attached to the epiglottis, it may be removed from above. If lower down, the larynx must be opened, an operation which will be easily added to the tracheotomy.

* Many very valuable observations on these points will be found in Dr. Watson's Lectures on the Practice of Physic.

† Histoire des Polypes des Larynx. [redacted], Stallard, Med. Gaz. 19th May, 1842. There is [redacted] Museum from Mr. Mayo's collection [redacted]

and supported by proper apparatus—and if strangulated, the stricture must be divided by operation.

VIII. DIAPHRAGMATIC HERNIA is generally a result of congenital deficiency, or accidental separation of the fibres of the diaphragm. But it may also be caused by violent falls on the abdomen, or by violent pressure of any kind, capable of lacerating the diaphragm, and driving some of the bowels into the thorax.* This form of hernia, if strangulated, will produce the ordinary symptoms—vomiting, constipation, and pain; which are not in any manner to be distinguished from the symptoms of ileus or intussusception—or from those produced when a fold of bowel is entangled in a rent in the omentum, or mesentery; or when the bowel is constricted by membranous bands resulting from previous inflammation of the peritonæum.

CHAPTER XIX.

SURGICAL DISEASES AND INJURIES OF THE RECTUM AND ANUS.

I. FOREIGN BODIES in the rectum sometimes require to be removed by surgical art. They may consist either of small bones or the like that have descended from above, or of pins, glyster-pipes, or other bodies introduced from below. Substances of very extraordinary dimensions (a blacking-bottle, for instance), have been forced into the anus. The grand point is first to dilate the bowel well, by passing in several fingers (oiled) or by means of a speculum, and then a proper forceps, or a lithotomy scoop, may generally be used with success.

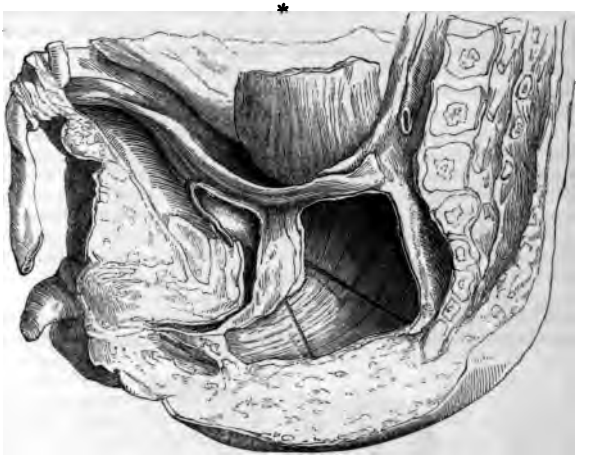
II. IMPERFORATE ANUS (*Atresia ani*) signifies a congenital closure of the rectum, and may occur in various degrees. The anus may be merely closed by thin, fine skin, which soon becomes distended with meconium; or the gut may terminate in a blind pouch at any point from the sigmoid flexure downwards, the anal aperture being altogether wanting; or the anus may be open for an inch or two, with an obstruction beyond; or the rectum may terminate in the bladder, or urethra, which will be known by the escape of urine tinged with meconium; or, although the anus may be closed, there may be a fistulous track leading from the rectum just above it, and opening somewhere in the perinæum.†

Treatment.—If the end of the intestine can be felt protruding when

* Reid on Diaphragmatic Hernia, Edin. Med. and Surg. Journ., Jan. and July, 1840.

† Case in South's Chelius, vol. ii., p. 329.

the child cries, a free crucial incision may be made into it without delay —if it cannot be felt, a day or two should be waited, so that it may become distended with meconium, and then a cautious incision should



be made with a double-edged bistoury, in the direction of the curve of the sacrum. If it succeed in reaching the bowel, the aperture should be kept open by tents.

But if this operation should fail in reaching the bowel, or if the rectum appears to be altogether deficient, the only resource is the *formation of an artificial anus* in the left loin. When the rectum opens into the bladder or urethra, an aperture must be made into the neck of the bladder for the free discharge of the fæces.†

III. SPASM OF THE SPHINCTER ANI is known by violent pain of the anus, with difficulty of evacuating the fæces. On examination, the muscle feels hard, and resists the introduction of the finger. This affection may be caused by constipation of the bowels, or disorder of the health. It may occur in sudden paroxysms which soon go off; or may last permanently, and lead to organic thickening and stricture of the anus. It is very frequently connected with piles, or with fissure of the anus, or ulcer just within it.

IV. FISSURE OF THE ANUS—a small crack, or chap, giving intense pain during the passage of motions.

* Imperforate anus. From the King's Coll. Museum.
† Case in Fergusson's Pract. Surg. 3rd ed., p. 720.

CHAPTER XXII.

SURGICAL DISEASES OF THE FEMALE GENITALS.

I. CATARRHAL VULVITIS.—Females—even young children—are subject to mucous or purulent discharges from the parts at the entrance of the vagina; which may also perhaps be excoriated. Purgatives, tonics, soap and water, and astringent lotions are the remedies. See p. 171.

II. NOMA signifies a phagedænic affection of the labia pudendi of young female children, precisely resembling the *cancrum oris*, p. 412, in its causes, and nature, and symptoms. After two or three days of low fever, the little patient is observed to suffer considerably whilst making water, and on examination, the labia present a livid erysipelatous redness and vesications, that are rapidly followed by phagedænic ulcers. This disease is very frequently fatal. The treatment is the same as directed for cancrum oris. The surgeon must be very careful not to mistake this or the preceding affection for the venereal disease; an error common enough among parents. This year there have been several criminal trials at Dublin of persons falsely accused of tampering with children.†

III. VESICO-VAGINA FISTULA signifies a communication between the bladder and the vagina. It generally results from sloughing of the parts after a tedious labour. As soon as it is discovered the patient should be made to lie on her face; the utmost cleanliness should be enforced by means of weak astringent injections and foment-

* Vesico-vaginal fistula; sketch of a patient in the position described in the text, with a catheter in the bladder: *a*, edge of fistula.

† Kinder Wood on a fatal affection of the pudenda of female children. Med. Chir. Trans. vol. vii. p. 84. Wilde, Med. Times, Oct., 1853.

fingers, otherwise it will be dragged along by the knife, and the incision will be ragged, and shorter than was intended. Thirdly, in cutting through the skin, the knife should be passed in at right angles to the surface, and should be at once carried down to the subcutaneous tissue; then the blade should be inclined downwards, and be made to cut through the skin to the requisite extent; and, lastly, as the incision is finished, the instrument must be again brought to a right angle with the surface. By these means the whole thickness of the skin will be cleanly divided, both at the beginning and end of the incision. Timid operators are apt to make the incision through the skin too limited, which embarrasses their subsequent proceedings; besides that cutting more of the skin subsequently (unless the patient is under the influence of chloroform) is very painful.

The author has not sufficient space to detail all the tedious varieties of incisions that are enumerated in systematic treatises. It is of little use to say that they may be made by cutting from without inwards, or by first plunging in the instrument, and then cutting outwards (as in bleeding), or that they may be simple or compound—straight, curved, or angular. It may be noticed, however, that when two incisions are to be made to meet near their extremities (as, for example, the two semi-elliptical incisions in amputation of the breast), the second should fall into the first *nearly*, but *not quite at its extremity*, so that there may be no little isthmus of skin left undivided between them. Again, in making a V incision, the second cut should not be begun where the first terminated, but at its other end; that is to say, it should be made *towards* the first, and not *from* it. In making a T incision likewise, the transverse cut should be made first, and the other be directed towards it. Lastly, the angle of a V incision should, if possible, be always dependent.

III. The Preparation of a patient for an operation is a most important element in its success. The object is to have every organ and every function in as healthy and tranquil a state as possible. Recourse should be had to regular diet, aperients, and gentle alteratives, with or without small doses of sedatives, till the pulse has become quiet, the tongue clean, the bowels regular, the liver, kidneys, and skin in good order, and the mind cheerful. Moreover, it is best not to perform an operation in very cold weather, if it can be avoided, especially upon the eye.

IV. The after Treatment is no less important, and should be conducted so as to ward off the most probable sources of danger—whether sinking from shock, or from loss of blood, or the occurrence of inflammation. The characteristic tendency of disease, at the present day, is decidedly toward phlebitis, erysipelas, diffused inflammations, and other maladies of a *low type*; and as we observed, when speaking of the prevention of phlebitis, it is most important that the patient should be supplied with beef-tea, and other nourishment, in sufficient quantity to maintain a healthy state of blood; and that he should be kept quiet. One of the most successful surgeons of London always

gives his patients half a grain of opium every five or six hours for the first two or three days after an operation, for the purpose of tranquillizing the nervous system, and his success proves the benefit of the plan.

V. AIR IN VEINS.—The entrance of large quantities of air into a vein is a most dangerous accident, that has sometimes occurred during the extirpation of tumours from the neck or axilla. A large vein being cut across, whose coats adhere to some firm textures around, so that they cannot collapse, a sort of bubbling sucking noise is suddenly heard, the patient instantly faints, and generally dies soon afterwards. On examination the right auricle is found distended with frothy blood. If any such sound should be perceived during an operation, the surgeon should instantly put his fingers on the spot that it proceeds from, and the patient, if faint, should be kept in the recumbent position with the head low, and should be well plied with brandy. The air has no noxious properties in itself, and if introduced slowly, in small quantity, does no harm; large quantities prove fatal by interfering mechanically with the action of the heart.*

CHAPTER II.

THE MINOR OPERATIONS.

I. EXTIRPATION OF TUMOURS.—A different proceeding is to be adopted in the case of cancer and of other growths. In the former it may be necessary to remove a portion of skin by two semi-elliptical incisions, if it appear to be contaminated by the diseased growth. But in extirpating wens or fatty or fibrous tumours, however large, it is a general rule not to remove any of the skin, unless it is much inflamed or ulcerated, or so entirely adherent to the tumour that its separation would be very tedious and difficult. Again, in the former case, it is necessary to cut quite wide of the diseased mass, and remove plenty of the surrounding tissue; in the latter case the incisions should be carried through the cellular cyst of the tumour. In all cases it is a better plan (unless the tumour is exceedingly large) to carry the dissection at once boldly to the deepest part where the largest vessels enter the tumour, than to tie the different branches as they are divided, by which means some vessels may perhaps be tied more than once. Again, it is requisite in every case that the extirpation be complete, because if the smallest portion is left, it may become the nucleus of a fresh growth. If, therefore, it is found that there is any portion of a tumour which cannot be cut out without fear of dangerous hæmorrhage, a

* For the best account of these curious cases, refer to Sir C. Bell's Practical Essays, Lond. 1841.

double ligature should be passed through its base, and be tied tightly on each side of it.

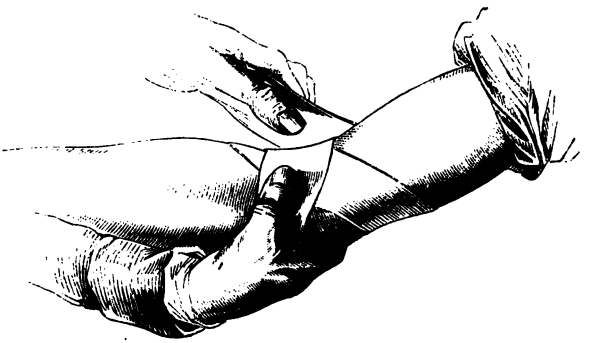
II. VENESECTION at the bend of the arm should always, if possible, be performed in the median-cephalic vein. A ligature being placed a little above the elbow (but not tight enough to stop the pulse at the wrist), the operator takes the fore-arm in his hand, places his thumb on the vein a little below the intended puncture, and then (using the right hand for the right arm and *vice versâ*) pushes the lancet obliquely into the vein, and makes it cut its way directly outwards. When sufficient blood has been taken, the surgeon should untie the ligature above the elbow, and place his thumb on the bleeding aperture. Next he should put a little bit of lint on the wound, and secure that with a strip of plaster, only removing his thumb sufficiently to admit of the application. Then he should remove his thumb enough to put on a little square compress of linen, and over that the middle of a bandage. This is to be passed round the elbow in the form of a figure of 8, and the two ends are to be crossed and turned backwards over the compress. The next figure is intended to show the way in which the surgeon should grasp the arm, and keep his thumb over the bleeding aperture till the bandage is secured.

The jugular vein is sometimes opened in cases of apoplexy in adults, and in children if the veins at the elbow are hidden by fat. The patient, if a child, being laid in a nurse's lap, with his head towards the surgeon, the latter puts his left thumb on the vein a little above the clavicle, and then opens it with a lancet, cutting towards the thumb, and in a direction downwards and inwards, so that the incision may cross the fibres of the platysma. When blood enough has been taken, the wound should be closed with lint and plaster, and not till then should the thumb be removed.

The veins in the leg, scrotum, or neighbourhood of the eye or ear,

* This cut shows the veins of the bend of the elbow, together with the relation of the brachial artery to the median basilic vein.

can readily be opened in the same manner instead of the ordinary mode of venæsection, or leeching, or cupping.



Abscess in the cellular tissue, inflammation of the fascia, phlebitis, neuralgia, varicose aneurism, and aneurismal varix, are occasional ill consequences of venæsection.

III. ARTERIOTOMY.—The temporal artery should be opened above the outer angle of the eyebrow—not just above the zygoma. The surgeon feels for the largest branch, steadies it with two fingers, one placed above, and the other below, the intended puncture—then pushes in the lancet in the same manner as in venæsection. The incision should be directed across the vessel, and should cut it about half through. When sufficient blood has flowed, the best plan is to introduce the lancet, and cut the vessel completely across, so that its ends may retract. A firm graduated compress should then be applied, and be confined with a bandage passing round the head; and some degree of pressure should be kept up on the wound for a week or ten days. Any subsequent bleeding or spurious aneurism must be treated by completely dividing the artery, if it has not been done already, and by pressure; but if the wound is much inflamed or ulcerated, so as not to admit of pressure, a transverse incision should be made on each side of it, and the artery be tied in both places.

IV. CUPPING.—The patient being placed in a comfortable position, with towels arranged so that his clothes may not be soiled by the blood, and being moreover protected from cold, so that the flow of blood to the surface may not be checked, and the operator having his scarificator, glasses, torch, spirits of wine, lighted candle, hot water, and sponge, conveniently arranged on a table close by; the first thing is to sponge the skin well with hot water, so as to make it somewhat vascular. The operator next dries it with a warm towel, and adapts

his glasses to the part. Their number must depend on the quantity of blood to be taken—from three to five ounces is a fair calculation for each glass. In the next place, he dips the torch in the spirit, sets it on fire, introduces it for half a second into one of the glasses, and immediately claps the latter on the skin—and the same with the other glasses in succession. As soon as the skin has become red and swollen, he charges the scarificator, and takes it between his right forefinger and thumb, at the same time holding the lighted torch between the little and ring fingers of the same hand. He then detaches one glass by insinuating the nail of his left forefinger under its edge—instantly discharges the scarificator on the swollen skin, and as expeditiously as possible introduces the torch into the glass, and applies it again. The same process is repeated with the other glasses. When they become tolerably full, or the blood begins to coagulate in them, they must be detached in succession and reapplied, if blood enough has not been taken: and when the operation is finished, the wounds should be closed with lint and plaster. There are several points connected with this operation that require notice. In the first place, the glasses must not be exhausted too much: if they are, the pressure of their rims will occasion severe pain—the blood will not flow—and the operation will very probably be followed by a considerable ecchymosis. Secondly, the position of the glasses must be slightly varied each time they are applied, so that their edges may not again press on the same circle of skin. Thirdly, the expediency of not burning the patient need scarcely be hinted at. Fourthly, in taking off the glasses, the upper part of each should be detached first, so that the blood may not escape. Lastly, the length of the scarificators must be adjusted to the thickness of the skin; for if the incisions are too deep, the fat will protrude through them, and prevent the flow of blood. The direction of the incisions should correspond to the course of the muscular fibres beneath: but this is of no great consequence. For *cupping on the temples* smaller glasses and scarificators are employed. A branch of the temporal artery is generally wounded, and the flow of blood may be expedited by slightly lifting the lower part of the rim of the glass. Pressure should be kept up on the wounds for some days afterwards, in order to prevent secondary hæmorrhage or false aneurism.

V. ACUPUNCTURE is easily performed by running in five or six needles with a rotatory motion. It is certainly very efficacious in some cases of neuralgia; but it is by no means easy to explain its operation. Acupuncture is also resorted to in anasarca, when the skin is much distended; and we have spoken of its utility in hydrocele, ganglion, hydrothorax, and ascites, for the purpose of permitting the serum to exude into the cellular tissue.

VI. ISSUES may be made by caustic, or by incision, or by the actual cautery. The first may be made either by rubbing a portion of skin of the requisite extent with the potassa fusa, or by making a paste with equal parts of the potass and soft soap, and laying it on the skin

till the latter is converted into a black slough. The parts immediately around the issue should be protected with several layers of sticking-plaster. After the application of the caustic, the part should be poulticed till the slough separates, and then the sore may be prevented from healing, either by binding several peas firmly on its surface, or by touching it occasionally with the caustic. The second species of issue is made by pinching up the skin, and slitting it up with a lancet, and then introducing some peas to prevent it from healing. It may be remarked, that issues should never be made over projecting points of bones, nor over the bellies of muscles, for they might degenerate into most obstinate sores. Thus, for diseased vertebræ, the issues should be made between the spinous and transverse processes; for diseased hip, *behind* the great trochanter, and not over it; for diseased knee, just below the inner tuberosity of the tibia. Issues, if indolent or irritable, should be healed up. They are only of use, says Mr. Vincent, when the actions carried on in them are vigorous and healthy.

VII. THE ACTUAL CAUTERY is certainly a very efficient, and it is very far from being the most painful, manner of effecting counter-irritation. On the contrary, its effects are speedy, and not attended with very much suffering. It is easily effected by means of an iron rod with a knob of the size and shape of an olive at one end of it, and a wooden handle at the other. The knob being heated red hot, is rubbed on the skin so as to make two or three blackened lines about half an inch wide, and an inch asunder. Then the cold-water dressing or a poultice may be applied till the shallow eschars separate; and it appears to be better to keep the sores open by touching them occasionally with the cautery, than by the ordinary irritating dressings.

VIII. SETONS are introduced by pinching up a fold of the skin, and pushing a needle through it armed with a skein of silk or cotton, or a long flat piece of India-rubber. As soon as one or two inches of the thread are brought through, the needle is cut off. A fresh portion of the thread is to be pulled through the wound every day, so as to keep up a constant irritation and discharge. If the discharge is insufficient, the thread may be covered with some irritating ointment before it is drawn under the skin.

IX. THE MOXA is a peculiar method of counter-irritation long practised in the East, and occasionally employed in Europe, for the relief of chronic nervous and rheumatic pains, or for chronic diseases of the joints. One or more small cones, formed of the fine fibres of the *Artemisia chinensis*, or of some other porous vegetable substance—such as German tinder, or linen impregnated with nitre, are placed on the skin over the affected part, and then are set on fire, and allowed to burn away so as to form a superficial eschar. The surrounding skin must be protected by a piece of wet rag, with a hole in it for the moxa.

It is convenient sometimes to use the moxa as a rubefacient or vesicant, and not as a cauterant. A roll of German tinder ignited may be held with dressing forceps at a little distance from the skin, the sur-

gum at the same time blowing upon it with a blowpipe till the skin becomes red.

X. VACCINATION.—The matter should be taken on the seventh or eighth day, before an inflamed areola is spread around the vesicle; and it should be *lymph*, clear and transparent, not purulent. The operator should make three punctures on one arm with a fine lancet, carrying the point of the instrument obliquely under the cuticle for about one-eighth of an inch, and, if possible, without drawing blood; or he may scratch or scrape off the cuticle. Then, if he has a patient to take the matter from, he ruptures a portion of the vesicle, dips the lancet in the lymph, and inserts it into each puncture. If he has the matter on *points*, he should hold them in the steam of warm water so as to liquefy it, and then insert one into each puncture, and allow it to remain three or four minutes.

XI. ELECTRICITY AND GALVANISM.—In certain cases of defective circulation and nervous influence; when the thigh is weakened and benumbed after sciatica; in cases of atrophy of the extremities after fever; when the extensors are paralyzed from long disuse, as after disease of joints; in deficient menstruation; in loss of voice from relaxation of the mucous membrane of the fauces; in hysterical neuralgia,—these powerful agents may be resorted to with every prospect of benefit. But the cases to which they are most applicable, are those of asphyxia from poisoning or hanging, when the affusion of cold water and other stimulants fail to excite the action of respiration. The best method in these cases is, to place one wire in front of the neck and the other at the pit of the stomach; or, if the sensibility is so feeble that this fails to take effect, a needle may be inserted deeply between the eighth and ninth ribs on either side, so as to reach the diaphragm, and the current be passed between them. The most convenient apparatus seems to be a single battery on Smee's or Daniell's principle, with a coil wound around a piece of soft iron, which is thereby converted into a temporary magnet, and with a contrivance for interrupting the circuit, and giving a stream of gentle shocks.

XII. GALVANO-PUNCTURE.—In obstinate neuralgia it is a good plan to insert two needles deeply, at two points in the course of the nerve, and to pass a galvanic current through them.

CHAPTER III.

BANDAGING.

I. BANDAGES usually consist of strips of linen, calico, or flannel, varying in breadth from one to three, five, or more inches, and in length from one to six, eight, or twelve yards. Sometimes they are made of India-rubber web, or of a substance like stockings; but, for most purposes, stout unbleached calico, or thin fine calico, will answer. They are generally rolled up longitudinally for use, and

hence have received the name of *rollers*. Besides the simple roller, there are many compound bandages, as the T bandage, and the many-tailed bandage (described at p. 257); but the latter are not now much in use, and, like other special bandages, are generally prepared by professed bandage-makers. Lastly, bandages may often be made out of handkerchiefs, or square pieces of linen.

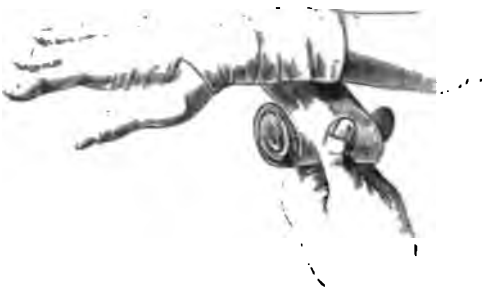
II. USES.—Innumerable are the properties assigned to various forms of bandages by the older writers; hence such names as the *retentive*, *expulsive*, *uniting*, *dividing*, *recurrent*, &c. We believe, however, that we shall not be far from the truth if we state the chief uses of bandaging to be these two, viz., 1st, to keep on dressings, to protect a diseased part from injury, and put some little restraint upon its motions; 2ndly, to afford a support to relaxed muscles, ligaments, and vessels. Deprive any part of its normal support, and varicose veins and dropsical effusions are sure to occur; and conversely many œdematous and other chronic swellings of the limbs and joints may often be cured by the proper application of bandages alone.

III. THE ROLLER.—In applying this to any limb, the surgeon should hold it as represented at p. 75, or in the next figure but one, and should pass it from one hand to the other as he encircles the limb with it. He should begin at the extremity of the limb, applying it most tightly there, and a very little more loosely as it ascends. He should unfold very little of it at a time, and should make each fold overlap about a third of the previous one. When the limb increases in size, he must turn the bandage on itself after the manner depicted in the cuts.

IV. BANDAGE FOR THE FINGER.—This is a simple strip of linen, that may be wound round the finger a few times with the requisite tightness. We introduce the figure in order to show how to fasten it

neatly without pins or stitches, by merely splitting up the end of the bandage into two tails, which may be turned opposite ways round the finger, and be tied in a bow. This is a most convenient way of securing dressings on the penis.

V. For the Hand.—A bandage about two inches wide may be passed in a figure of 8 round the hand and wrist, excluding the thumb, and may be finished by one or two circular turns round the wrist.



VI. For the Fore-arm.—After applying it about the hand and wrist as just described, carry it up the fore-arm, and in every turn fold the bandage sharply and smoothly back upon itself, in such a way that it may lie smoothly on the limb.

VII. For the Foot.—Let the roller be first passed round the metatarsus, and then be carried up round the ankle, and back again round the foot exactly as depicted at page 75. The bandage should always be brought up on the inner side of the instep, as there shown, in order to support the arch of the foot.

VIII. For the Leg.—After the foot and ankle have been well

enveloped let the bandage be carried up the leg, and be turned sharp on itself on the calf, in order that it may lie closely, and the folds not be separated.

IX. For the Knee.—To support the knee, in ordinary cases, a bandage may be passed round it in a figure-of-8 form, excluding the patella. If that bone is to be covered, the bandage must be passed lightly over it afterwards several times, making turns when necessary to procure smoothness.

X. Four-tailed Knee Bandage.—When it is merely wished to keep on dressings, or to give slight support, the four-tailed bandage

over which the band passes, with a screw, by turning which the bridge is raised, and the band tightened. The pad should always be placed so as to compress the artery against the bone. The advantage of this instrument is, that it compresses the smaller arteries as well as the principal trunk; its disadvantage is, that it arrests the venous circulation, and causes a greater loss of venous blood; wherefore, it should never be constricted tightly until the incisions are just commencing.

This, like other amputations, may be performed in two ways—either by the *circular incision*—that is, by cutting round the limb from without towards the bone; or by the *flap operation*—that is, by transfixing the limb, and then cutting outwards. The flap operation is the favourite with the rising generation of surgeons: it certainly can be performed with much more facility; and it enables the surgeon to select a flap where he pleases, so that when the flesh on one side of the limb is destroyed by disease or injury, the end of the stump may be covered with a flap taken almost entirely from the sound side, and a greater length of limb may be preserved. It affords, too, a greater certainty of preserving a sufficiency of flesh to cover the bone; and it enables the muscles to be more easily retracted, and the bone exposed for the application of the saw. It entirely avoids the difficulty, also, which sometimes occurs in the circular operation, of retracting the skin when it has become adherent to the parts beneath. But, as Sir C. Bell observes, the grand rule in all cases is, to save integument enough to cover the muscle, and muscle enough to cover the bone, and not to scrape off the periosteum. And if these things are done, it requires ingenuity to make a bad stump.

In this, as in all other operations, we suppose the patient to be under the influence of chloroform; unless there is some rare and special reason to the contrary.

1. *Circular Method.*—The surgeon stands on the outer side for the left leg, and on the inner for the right; so that he may use his left hand to grasp and steady the part which he is to amputate. The artery must be compressed by one of the methods before described, and an assistant must grasp the limb with both hands, so as to draw up the skin as high as possible. Then the surgeon commences by putting his arm under the thigh, and makes an incision at one sweep, completely round the limb, through the skin and fat down to the fascia. The assistant is now to draw the skin further up, the retraction being aided by a few touches with the knife; and then the knife, being put close to the edge of the retracted skin, is to be made to divide everything down to the bone by another clean circular sweep. The next thing is, to separate the muscles from the bone for another inch or two with the point of a knife, especially those connected with the *linea aspera;* and then the periosteum having been divided by one more sweep—the *retractor,* a piece of linen with a longitudinal slit in it, is put over the face of the stump, and the muscles are to be drawn up with it. Now the bone must be sawn

through. The heel of the saw should first be put on the bone, and it should be drawn up so as to make a groove, before working it downwards; it should be used very lightly, and the last few strokes should be excessively short and gentle, that the bone may not be splintered. If it is, the irregular part must be removed by nippers. The femoral artery should now be tied, its orifice being seized and slightly drawn out by forceps; and afterwards any large branches that appear in the muscular interstices. Then all compression should be *suddenly ceased*, so that any arteries that are liable to bleed may do so, and be tied at once. Hæmorrhage from large veins is to be restrained by elevating the stump, and making compression for a short time with the finger. If, however, nothing else will do, they must be tied. Any obstinate oozing from small vessels should be restrained by sponging with cold water, or perhaps by a touch with arg. nitras. Then a light bandage may be passed round the limb above the stump, and the edges of the wound should be approximated with a few strips of plaster, with or without sutures. The edges are to be brought together in a straight line, which may be made either perpendicular or horizontal, the latter, however, being probably the better plan. The ligature should be left hanging out in the interstices of the adhesive straps. The patient should then be removed to bed, and the stump be supported on a pillow covered with oil-cloth. No other application will be needed save a cloth dipped in cold water. Pain may be allayed by an opiate. The stump may remain as it is for some days, the discharge being merely wiped occasionally from its surface. But after from four to six days, sooner or later, according to the quantity of the discharge and the feelings of the patient, the dressings should be changed, the straps being taken off and replaced one by one, with care not to disturb the ligatures, and the hands of an assistant being employed to support the edges, and prevent their falling asunder. At the subsequent dressings, the points to be attended to are, to renew the light bandage occasionally, which was passed round the stump soon after the operation, in order to support the muscles, and prevent their retraction—to bring together the edges of the wound with adhesive straps—to remove the ligatures when loose—(that on the femoral artery should not be disturbed for a fortnight)—and to accelerate cicatrization by the nitrate of silver, or other stimulants, if the granulations appear languid.

There are a few varieties in the manner of performing this circular operation that require a brief notice. Some surgeons, after having cut through the skin, dissect it from the fascia, and turn it back—a proceeding necessary enough if this operation is performed (which it never should be) when the cellular tissue is condensed and adherent. Again, if the patient is *very emaciated*, the circular incision may be carried down to the bone at once without ceremony, because in such patients the muscles always retract greatly. Sir C. Bell recommends the skin not to be divided quite circularly, but the knife to be inclined a little, first to one side, then to the other, so as to make two oval

guttas duas; aquæ f℥viiss.; syrupi zinziberis f℥ss. Misce. Dosis, pars octava.

℞. Syrupi papaveris f℥iv.; magnesiæ carbonatis ʒfs.; spiritus ætheris nitrici; tincturæ hyoscyami, singulorum f℥ij.; misturæ camphoræ f℥vij. Misce. Dosis, pars sexta subinde. *To tranquillize the system after injuries, operations, accouchements, hæmorrhage, violent mental excitement, &c.*

Mr. Cole's Stimulating Narcotic Draught for Delirium Tremens.

℞. Extracti opii (Hill) gr. ij, vel iij; aquæ ferventis f℥iv.; tere in mortario et adde *brandy* f℥iss.; sacchari q. s. Misce. *The patient should be allowed to sip this out of a tumbler, like a glass of grog.* Cole's Mil. Surg., p. 59.

§ II. Aperients.

33. *Black Draught.*

℞. Sennæ foliorum ʒvj.; zinziberis concisi ʒss.; extracti glycyrrhizæ ʒij.; aquæ ferventis f℥iz. Post horas tres cola, et adde spiritûs ammoniæ aromatici f℥ij.; tincturæ sennæ, tincturæ cardamomi compositæ ää f℥ss. Dosis f℥jss.*

34. *Red Draught.*

℞. Magnesiæ sulphatis ʒij—iv.; syrupi zinziberis, tincturæ cardamomi compositæ, singulorum fʒj.; infusi rosæ compositi fʒx. Misce.

35. *Haustus Magnesiæ Sulphatis Acidus.*

℞. Magnesiæ sulphatis ʒj.—ʒiv.; syrupi aurantii fʒij.; acidi sulphurici diluti ♏x.; aquæ f℥j. Misce, fiat haustus. *To this draught may be added one grain of sulphate of zinc, or of sulphate of iron, or two grains of quinine, in cases of debility.*

36. *Haustus Magnesiæ Albus.*

℞. Magnesiæ sulphatis ʒij.; magnesiæ carbonatis ℈j.; syrupi zinziberis fʒj.; aquæ anethi f℥xj.; Misce, fiat haustus. *This draught will often be retained by the stomach when almost every other is rejected.*

37. *Cordial Aperient Draughts.*

℞. Pulveris rhei, potassæ sulphatis ää ℈j.; decocti aloes compositi aquæ menthæ piperitæ ää f℥vi.; spiritus ammoniæ compositi f℥ss. Misce, fiat haustus. *For flatulent gouty persons.*

℞. Tincturæ sennæ f℥ss.; tincturæ rhei f℥ss. Misce.

* This draught is greatly improved, both in flavour and efficacy, by the addition of a few caraway seeds, one ounce of buckthorn juice, one of tincture of jalap, and six of moist sugar.

38. *Rhubarb Draughts and Powders.*

℞. Pulveris rhei gr. x.; magnesiæ ustæ gr. v.; pulveris zinziberis gr. ij. Misce, fiat pulvis, omni mane sumendus.

℞. Pulveris rhei, bismuthi trisnitratis, confectionis aromaticæ, āā ℈ij.; aquæ menthæ piperitæ ℥iv.; Misce. Sumatur pars quarta bis die. *In habitual constipation and flatulence.*

℞. Rhei ℈ss.; sodæ sesquicarbonatis ℈ss.; spiritus lavendulæ compositi, spiritus ammoniæ aromatici ℥ss.; aquæ pimentæ ℥x. Misce.

℞. Rhei gr. xv.; magnesiæ carbonatis ℈ss.; spiritus ammoniæ aromatici ℥ss.; syrupi ℥j.; aquæ anethi ℥x. Misce. *For cases of colic, diarrhœa, with acidity and indigestion, &c.*

Rhubarb and Polychrest Salt.

℞. Pulveris rhei, potassæ sulphatis āā ʒj.; pulveris zinziberis ʒj. Misce. Dosis gr. x.—xl. *A capital aperient for children; serving, in most cases of mere indisposition, all the purposes of grey powder.*

℞. Rhei, potassæ sulphatis āā ℈j.; spiritus lavandulæ compositi ℥j.; aquæ ℥j. Misce, fiat haustus. *A warm efficient purgative.*

39. *Saline Aperient Draughts.*

℞. Sodæ potassio-tartratis ʒiv.; succi limonum ℥ii.; syrupi zinziberis ℥j.; spiritûs myristicæ ℥ss. aquæ ℥ij. Misce, fiat haustus. *A cooling purgative.*

℞. Sodæ potassio-tartratis ʒij.; sodæ sesquicarbonatis ℈j.; sacchari albi ʒj.; fiat pulvis, e cyatho aquæ sumendus, cum cochleari magno succi limonis, vel cum acidi citrici granis quindecim.

40. *Epsom Salts and Tartar Emetic.*

℞. Magnesiæ sulphatis ʒj.; antimonii tartarizati gr. j.; aquæ menthæ ℥x. Misce; sumantur cochlearia magna tria, quartâ quâque horâ. *An active nauseating aperient, fit for robust persons threatened with acute inflammation.*

41. *Saline Aperients with Tonics.*

℞. Magnesiæ sulphatis ʒiv.; ferri sulphatis gr. viii.; quinæ disulphatis gr. xii.; acidi sulphurici diluti ℥iss.; syrupi zinziberis ℥j.; tincturæ ejusdem ℥ij.; aquæ ℥vij. Misce. Dosis, pars octava bis die.

℞. Magnesiæ sulphatis ʒj.; acidi sulphurici diluti ℥j.; ferri sulphatis gr. xv.; infusi gentianæ compositæ ℥iij.; tincturæ aurantii ℥iv.; infusi rosæ ℥vj. Misce. Dosis, pars sexta bis quotidie.

℞. Ferri potassio-tartratis ʒij.; sodæ potassio-tartratis [illegible] Misce, fiant pulveres sex. Sumatur una mane, ex cyatho [illegible]

of saline purgatives with tonics, so as to answer the double intention of evacuating the abdominal veins, and bracing the system in most chronic complaints. The second is a prescription of Dr. Jephson's, who is famous for the cure of [illegible]

42. *Pulvis e quatuor Salibus.*

℞. Sodæ chlorati, sodæ sulphatis, magnesiæ sulphatis, sulphatis ferri, singulorum partes æquales. Optime misceantur et dividantur in aquam. Dosis ʒj.—iv., ex cyatho aquæ. *An agreeable saline aperient. A grain of sulphate of iron may be added to each dose, which may be increased, if agreeable.*

43. *Hospital House Physic.*

℞. Magnesiæ sulphatis ℥ij.: pulveris rhei, jalapæ ää ʒj.: aquæ menthæ piperitæ f℥vij. Misce. Dosis, pars sexta.

44. *Acetum Purgans.*

℞. Potassæ bitartratis ℥ss.: foliorum sennæ ʒiij.; cinnamomi contusi, anisi ää ʒss. aceti lbj. Post sufficientem infusionem, cola, et serva. Dosis f℥j. *Ruspini, Pharm. Univ.*

45. *Castor Oil and Turpentine Draught.*

℞. Olei terebinthinæ, olei ricini ää f℥vj.; tincturæ sennæ f℥ij. mucilaginis acaciæ f℥ij.; aquæ menthæ quantum satis sit ut fiat haustus.

46. *Aperient Electuaries.*

℞. Pulveris potassæ supertartratis ℥ss.: sulphuris præcipitati ʒj.—v.: confectionis sennæ ℥j.: syrupi zinziberis, quantum satis sit.

℞. Magnesiæ ustæ, potassæ supertartratis, pulveris rhei, ää ʒj.: pulveris zinziberis ʒss.: theriacæ, quantum satis est.

℞. Mannæ, confectionis sennæ, ää ℥j.: sulphuris ʒiij.; syrupi quantum satis sit. Dosis ʒj.—iv., omni nocte horâ somni.

47. *Pilulæ Cathorticæ.*

℞. Aloes ℥ss.; pulveris colocynthidis, cambogiæ aa ʒj.; jalapæ ʒij.; saponis ʒj.; antimonii tartarizati ℈ss.: olei caryophillorum ♏xx.: contunde simul, et divide in pilulas, pondere granorum quinque.

48. *Pilulæ Cathorticæ cum Calomelane.*

℞. Pilulæ præcedentis ʒiv.: calomelanos ʒj. Misce et divide in pilulas lx.

Pills for Hypochondriasis.

℞. Extract of colocynth compound ℈ij., oil of croton three drops.—Divide in pilulas octo, quarum sumantur duæ. *For turpentine applied from outside.*

Blue Pill and Lavender.

℞. Pilulæ hydrargyri ℈j., extract of colocynth compound ℈ij. Misce, fiant pilulæ duodecim.

Liniment of Iron with Lime.

℞. Ferri sulphatis aquæ bullientis ℥ij., pulveris ℥ij. Misce, et divide in partes iv. Iisdem in vase aquæ servatis, et singulæ quotidie cum aqua calcis exhibitæ.*

Pills for Diarrhœa.

℞. Extracti cymæ sativæ bullientis, opii puri singuli grammatis ℈j. Solve in aquæ ℥j. et divide in pilulas xvj. Capiat unam pilulam ter in die, si opus sit, sumendo. *Tea and Coffee are to be avoided. Fish is not to be eaten.*

Liniment of Camphor and Opium.

℞. Pulveris camphoræ ℥ij., olei olivæ ℥iij., opii puri ℈ij. Misce et divide in partes vi. Singulis noctibus una ex his in pede aperto et ante ignem calefacta diligenter inungatur.

℞. Camphoræ ℥ij., olei olivæ ℥iij., opii puri ℈ij. Misce et divide in partes vi. Singulis noctibus una ex his in pede aperto et ante ignem calefacta diligenter inungatur.

Liniment and Lime on Inflamed Skin.

℞. Olei lini bullientis ℥iij., olei olivæ ℥iij., aquæ calcis ℥iij. Misce et divide in partes vi. Singulis noctibus [illegible] *Tea and Coffee are to be avoided.*

Liniment of Iron.

℞. Ferri pulveris [illegible]

* Vide [illegible]

cambogiæ gr. x. Misce et divide in pilulas duodecim: sumantur una vel duæ horâ somni. *An active purge, not ir to the rectum.*

55. *Ginger and Electuary.*

℞. Gingiberis pulveris ʒij.; sulphuris, rhei, ää ʒj.; zinzib Terebinthinæ quantum satis sit ut fiat electuarium. Dosis, pars se

56. *Aperient Electuaries.*

℞. Pulveris guaiaci gr. v.; pulveris jalapæ ℈j.; pulveri mellis cum posit. ℈ss. Misce, fiat pulvis bis die sumendus.

℞. Pulveris guaiaci ʒij.; pulveris rhei ʒss.; sulphuris ʒj veris myristicæ ʒss.; therebinthinæ quantum satis est ut fiat electi Dosis, pars sextia omni nocte. *In rheumatic Rheumatic diseases a mineral purge, and the Cubs a Powder.*

57. *Sulphate of Magnesia.*

℞. Magnesiæ sulphatis ℈j.; magnesiæ sulphatis ʒij.; zinziberis ʒij.; aquæ fʒiss. Misce, fiat haustus mane sumend *Give it cold, to avoid the griping disagreeable.*

℞. Magnesiæ sulphatis, pulveris rhei ää ℈j.; spiritus la mentæ ʒij.; aquæ fʒiss. Misce, fiat haustus.

§ III. Alterative and Febrifuge Medicines.

58. *Saline Draughts.*

℞. Potassæ nitratis ℈ij.; sodæ sesquicarbonatis ℈j.; v mentæ ʒj.; syrupi croci, spiritûs ætheris nitrici ää fʒj.; a Misce. Dosis fʒss. quartâ quâque horâ.

℞. Potassæ nitratis gr. x.; saccheri ℈i. Misce, fiat pulvis bis e cyatho vinario aquæ mentha viridis. *Green mint wa nitre fresh, as it operates like mi ture, and produce a pungen sensation on the tongue and palate. But the salt should dissolve at the moment of administration, and the mint wate be quite cool. Attention to these trifles makes a great differ patient who is parched with fever.*

℞. Potassæ bicarbonatis ℈iv.; syrupi zinziberis fʒij.; aqu Dosis fʒiss. quartâ quâque horâ, cum fʒss. succi limonum re

℞. Liquoris ammoniæ acetatis fʒij.; mistura c spiritûs ætheris nitrici fʒss. Misce. Dosis f horâ.

℞. Ammoniæ sesquicarbonatis ℈ijss.; tinct posita fʒss.; aquæ fʒv. Misce. Dosis f

cum cochleari magno [illegible] *early stage of erysipelas.* [illegible]

59. *Digitalis* [illegible]

℞. Tinct. digitalis ♏xv.: [illegible] fʒjss. Misce; fiat haustus [illegible]

[illegible]

℞. Sodæ biboratis ʒj.: [illegible] ʒss. Misce et divide in [illegible] e cyatho aquæ. *In lithic [illegible]*

61. *Phosphate of Soda.*

℞. Sodæ phosphatis ʒiij. [illegible] aquæ. *As an aperient* [illegible]

℞. Sodæ phosphatis ℈i.; [illegible] fiat haustus bis die sumendus.

62. *Calomel and Opium.*

℞. Calomelanos gr. i.—ii.: pulveris [illegible] rhizæ quantum sufficit ut fiat [illegible] *To mercurialize the system in acute [illegible]*

Calomel and Opium.

℞. Calomelanos i.—ii.; pulveris opii gr. ½—¾; [illegible] zati gr. ½; extracti glycyrrhizæ [illegible] *This formula may be used when [illegible] sthenic inflammation.*

63. *Alterative Pill.*

℞. Pilulæ hydrargyri gr. ij.; extracti hyoscyami [illegible] veris Doveri) gr. ij. Misce, fiant pilula bis vel [illegible] *mercurialize the system in languid inflammation.*

64. *Alterative Powders.*

℞. Hydrargyri cum creta gr. iij.—vi.; pulveris Doveri [illegible] Sodæ sesquicarbonatis, sacchari albi āā ℈j. Misce, fiat pulvis omni nocte sumendus.

℞. Hydrargyri cum creta gr. ij.; pulveris rhei gr. v.; sacchari ℈ss.; pulveris cinnamomi gr. v. Misce, fiat pulvis, omni nocte sumendus. *As a gentle alterative in chronic diseases, when the secretion of bile and urine is scanty.*

65. *Calomel and Colchicum.*

℞. [illegible] extracti colchici aceticí gr. xij.: extracti

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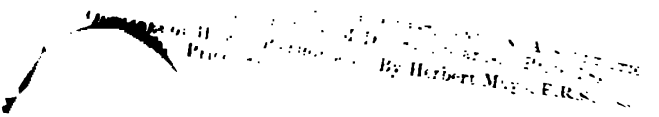

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